Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-72

Indiana & Ohio Railway (IORY)
Cincinnati, Ohio
August 28, 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 # HQ-2005-72

1.Name of Railroad Operating Train #1: Indiana & Ohio Rwy [IORY]	1a. Alphabetic Code: IORY	1b. Railroad Accident/Incident No.: IO05502
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident: N/A
3.Name of Railroad Responsible for Track Maintenance: Indiana & Ohio Rwy [IORY]	3a. Alphabetic Code: IORY	3b. Railroad Accident/Incident No.: IO05502
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 08 / Day 28 / Year 2005	6. Time of Accident/Incident: 06:30:00 ☐ 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): 13

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
1	0	1	0	Oasis Subdivision

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Cincinnati	5.6	N/A	OH	HAMILTON

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
85 F		2		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
Undercliff (Linwood)		1	0		3

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry) 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	A. Spec. MoW Equip. Code	26. Was Equipment Attended? 1. Yes 2. No	Code	27. Train Number/Symbol
	5	1. Yes	2	N/A

28. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	29. Trailing Tons (gross tonnage, excluding power units)	30. Method(s) of Operation (enter code(s) that apply)	30a. Remotely Controlled Locomotive?
0 MPH	N/A	N/A	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	0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter: 0

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

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

Alcohol	Drugs
N/A	N/A

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

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	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

35. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	0	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
0	0	M599	N/A

Number of Crew Members

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

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 0 Mi 0	Hrs 0 Mi 0

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

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

OPERATING TRAIN #2

52. Type of Equipment Consist (single entry) 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	A. Spec. MoW Equip. Code	53. Was Equipment Attended? 1. Yes 2. No	Code	54. Train Number/Symbol
	N/A	1. Yes	N/A	N/A

55. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	57. Method(s) of Operation (enter code(s) that apply)	57a. Remotely Controlled Locomotive?
0 MPH	N/A	a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track	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
N/A			N/A N/A N/A N/A N/A	N/A

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)	0	N/A	N/A		N/A	N/A
(2) Causing (if mechanical cause reported)	0	N/A	N/A	60. Was this consist transporting passengers? (Y/N)	N/A	

61. 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	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

62. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

63. Equipment Damage This Consist	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
0	0	N/A	N/A

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

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

76. EOT Device?	77. Was EOT Device Properly Armed?	78. Caboose Occupied by Crew?
1. Yes 2. No N/A	1. Yes 2. No N/A	1. Yes 2. No 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?	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	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)	5

84. Position of Car Unit in Train
N/A

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	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	2

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

21,050 LBS, STYRENE MONOMER, STABILIZED, 3, UN2055,

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		

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

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

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

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

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

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

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

96. Driver	Code
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)	N/A

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

98. View of Track Obscured by (primary obstruction)	Code
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	N/A

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

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

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

102. Highway Vehicle Property Damage (est. dollar damage)	103. Total Number of Highway-Rail Crossing Users (include driver)
0	0

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

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

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

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

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

109. SYNOPSIS OF THE ACCIDENT

At about 6:30 pm, August 28, 2005, while standing at Undercliff Yard, Cincinnati, OH, tank car PLCX 224841 was observed venting from its safety valve as it was awaiting final movement to the consignee. PLCX 224841 was loaded with 170,967 lbs RQ, Styrene Monomer, Stabilized, 3, UN2055, PGIII.

At 6:35 pm, the same day, emergency response crews from the Cincinnati Fire and Police Departments responded to the scene, observing a large plume of smoke being emitted from the tank car safety valve. After establishing an "Incident Command", the "Incident Commander" issued an immediate evacuation order for residents in 30 homes along Eastern Avenue in Cincinnati, OH. Additionally, a "Shelter in Place" advisory order was issued for surrounding communities.

A combination of "manned" and "unmanned" hose lines were set up by Cincinnati Fire Department personnel to cool the tank car and slow the release of Styrene Monomer, Stabilized, from the safety valve. This continued through the night, but on the morning of August 29, 2005, venting increased.

With increased venting from PLCX 224841, the Incident Commander ordered an evacuation of all residents and businesses within one mile of the incident site, affecting 800 people and area businesses. Cincinnati Lunken Airport was also closed and remained closed during the entire incident. The Ohio River was also closed to navigation, but only for about 2 hours.

The response teams sprayed water on the tank car jacket and subsequently circulated water through the tank car steam lines to cool the tank. These actions reduced the internal pressure inside of the tank car, subsequently allowing 40 gallons of an inhibiting (stabilizing) agent to be added to the Styrene Monomer, Stabilized, stopping the reaction.

At 9:30 am, on August 31, 2005, the evacuation order was lifted, allowing residents back into their homes and businesses to reopen. An exclusion zone of 100 feet was maintained around the tank car, while Cincinnati Fire Department personnel continued to cool the car. Cincinnati Lunken Airport was also reopened.

110. NARRATIVE

Circumstances Prior to the Accident:

On December 30, 2004, tank car PLCX 224841 was offered into rail transportation loaded with 170,967 lbs RQ, Styrene Monomer, Stabilized, 3, UN2055, PGIII. The car was offered by Westlake Styrene LP in Sulphur, LA. consigned to Westlake Styrene Corp., c/o Queen City Terminals, Cincinnati, OH.

On January 7, 2005, the tank car was accepted into rail transportation by the Union Pacific Railroad (UP), routed to East St. Louis, IL, for interchange to the Norfolk Southern Railway Co. (NS). NS continued to move the car towards its destination, routing the car to Cincinnati, OH, where it was interchanged to the Indiana & Ohio Railway (IORY) for final movement to the consignee on January 21, 2005. The car was moved from the interchange to the IORY McCullough Yard, awaiting movement for final delivery to the consignee.

To move the car the final mile to the consignee, IORY procedures require that a "Repetitive Waybill Code" (RWC) is input by a clerk into the computer based, "Primary Waybill Detail" screen. The clerk responsible to make this entry inadvertently entered the RWC for the Canadian National Railway (CN) instead of the RWC for Queen City Terminals. This entry generates a "Patron Report" notifying the receiving party that the car has arrived. This "key punch" error electronically mis-routed the car to the CN though the car was never physically delivered to the CN. This error also meant that Queen City Terminals was never notified that the car was awaiting delivery as it was never listed on their "Patron Report".

On January 21 and again on January 24, 2005, Queen City Terminals sent notices to the IORY, including copies of the bill of lading, requesting delivery of the tank car. The IORY "Customer Service Department" discovered the error involving the incorrect RWC and revised it to the correct RWC on the computer based "Charge Report" screen. The customer service personnel were not aware that the "Charge Report" screen does not revise the "Primary Waybill Detail" screen, nor the RWC that generates the Patron Report. As a result, the "Primary Waybill Detail" remained unchanged, and the "Patron Reports" sent to Queen City Terminals never showed that PLCX 224841 was available for delivery.

On January 25, 2005, PLCX 224818, another tank car with similar initials and numbers, was delivered to Queen City Terminals. PLCX 224818 was also loaded with RQ, Styrene Monomer, Stabilized, 3, UN2055, PGIII, and shipped form Westlake Styrene LP, Sulphur, LA.

No further requests were made by Queen City Terminal for delivery of PLCX 224841. Additionally, Westlake Styrene LP made no inquiry concerning PLCX 224841 until after they were notified of the release on August 28, 2005.

According to the IORY's car movement history, PLCX 224841 stayed in McCullough Yard, Sharonville, OH, for approximately six weeks before it was moved to Undercliff (Linwood) Yard, Cincinnati, OH, on March 12, 2005, where it remained until the incident on August 28, 2005. The Accident:

On August 28, 2005, tank car PLCX 224841 was still located at Undercliff Yard, Cincinnati, OH, having not been forwarded to the consignee for delivery. PLCX 224841 had been in transportation for approximately seven months and was only one mile from the consignee when it began to polymerize, resulting in the release of approximately 21,050 lbs of Styrene Monomer, Stabilized, via the safety relief valve.

Emergency response crews from the Cincinnati Fire and Police Departments were notified and responded to the incident. Other notifications were made to the IORY, Queen City Terminals, Westlake Sulphur LP, as well as regulatory personnel for PUCO, EPA and FRA.

The Cincinnati Fire Department established an Incident Command at the scene and the Incident Commander initiated an immediate evacuation of about 30 homes

along Eastern Avenue which is adjacent to Undercliff Yard. A combination of "manned" and "unmanned" hose lines were set up by Cincinnati Fire Department personnel to cool the tank car and slow the release of Styrene Monomer, Stabilized, from the safety valve.

On the morning of August 29, 2005, at about 6:00 am, with increased venting from the car, the evacuation was increased to one mile, affecting about 800 residents and all area businesses, including Cincinnati Lunken Airport, a general aviation facility. A "Shelter in Place Order" was also issued for Ft. Thomas, KY, directly across the Ohio River from the incident site. Three Cincinnati Police Officers reported being exposed to the vapors while setting up road blocks and evacuating the public. The symptoms included tightness of the chest, nausea, eye irritation and one incident of dermal reaction with a rash on the exposed areas of the skin. The officers were treated at a local hospital and released.

The Ohio River was also closed to navigation, but after about two hours, this order was rescinded. The evacuation order was later reduced by the Incident Commander to a ½ mile radius at 5:00 pm, on August 29, 2005, after air monitoring confirmed the exposure limits of the outlying areas. To continue mitigation, "unmanned" hoses continued to pour water on the tank car jacket, attempting to slow the reaction and reduce internal pressure within the tank car.

At about 9:30 am on August 29, 2005, representatives from Westlake Styrene LP arrived. At the request of the Incident Commander they provided advice on mitigation of the incident. Westlake Sulphur LP personnel suggested monitoring the temperature of the tank car to determine if the reaction was increasing or decreasing within the car. They also suggested circulating water through the tank car steam coils to slow the reaction.

At 2:00 pm on August 30, 2005, Westlake and Cincinnati Fire Department personnel approached the tank car and measured the temperature of the tank car saddle at 270 degrees Fahrenheit. They also hooked up a water connection to the right side steam coil and circulated water through the right side steam coils to cool the tank. At 6:00 pm, a water connection was also hooked up to left side of the tank car in an attempt to cool the tank car further. This slowed the reaction, reducing the temperature at the tank cars saddle from 270 degrees Fahrenheit at 3:15 pm, on August 30, 2005 to 105 degrees Fahrenheit at 9:00 am, on August 31, 2005.

When the pressure was sufficiently reduced, 40 gallons of an inhibitor (stabilizing agent) was added to the Styrene Monomer, stopping the reaction within the car. The inhibiting agent, tertiary butylcatechol (TBC), stabilizes raw Styrene Monomer and gives it a shelf life dependent upon the amount added.

At 9:30 am, on August 31, 2005, the evacuation order was lifted allowing residents back into their homes and businesses to reopen, including Cincinnati Lunken Airport.

Analysis and Conclusions:

PLCX 224841

Tank car PLCX 224841 was offered for transportation on December 30, 2004, remaining in transit until August 28, 2005, for a total of 241 days. Records show that the inhibiting agent, tertiary butylcatechol was added to the Styrene Monomer at the rate of 15 parts per million (ppm), stabilizing the chemical for a period averaging in excess of 90 days, depending upon temperature and storage conditions.

The inhibiting agent added at 15 ppm should have been more than sufficient to move the materials from the shipper, Westlake Sulphur LP to the consignee, WSC Terminals, c/o Queen City Terminals Cincinnati, OH. At 241 days, the inhibiting agent became depleted allowing uncontrolled polymerization, resulting in an exothermic reaction and associated rapid increase in temperature.

The temperature build-up created pressure sufficient to activate the tank car safety valve, which was set at 75 lb., start to discharge. The pressure and heat associated with the reaction subsequently caused the tank car manway cover gasket to fail, allowing vapor to be released from around the manway cover also.

Inspection of PLCX 224841, after the reaction was stabilized showed no damage other than the failed manway cover gasket. The gasket was changed, and as a precaution, the safety valve was also changed prior to the car being returned to the shipper for offloading and evaluation.

Prior to movement back to the shipper, the tank car was weighed three times at AluChem, Inc., Reading, Ohio, on a track scale to determine the amount of the styrene remaining in the tank car. An average of the three scale tickets (attached) indicates that approximately 21,050 lbs of Styrene had been released into the environment via the safety relief valve over the five day period.

The shipment was reclassified and described by the shipper as Flammable Liquid, N.O.S. (Styrene), 3, UN1993, PGIII, RQ (Styrene), Marine Pollutant (Styrene) and shipped back to Westlake Chemical Corporation's Sulphur, LA, terminal.

The Indiana & Ohio Railway Co.

As of August 28, 2005, tank car PLCX 224841 was located at Undercliff Yard, having been in transit for 241 days. Investigation showed that a series of clerical errors resulted in the car being lost, resulting in the failure of the IORY to deliver the car when a request was made for delivery by Queen City Terminals. The specific clerical errors were as follows.

The clerk failed to key the correct Repetitive Waybill Code (RWC) into the computer system's Primary Waybill Detail screen. This error instructed the car to be moved for interchange to the Canadian National Railroad, though the car was never physically moved towards the interchange.

The possibility that the tank car was delivered to another railroad in the interim was excluded since the PLCX 224841 was not recorded as being interchanged by any other railroads prior to the incident. There is no reason to believe that the tank car ever left the IORY's property and was physically located within one of the two freight yards from January through August, 2005.

The error made was subsequently identified, but the clerk mistakenly updated the RWC only via the Charge Report screen instead of utilizing the Primary Waybill Detail screen. The Charge Report screen does not automatically update the RWC on the Primary Waybill Detail screen which produces the Patron Report.

The Patron Report is a computer generated consignee notification that lists the cars destined for each consignee. It is automatically generated and provided electronically to the consignees each day. This resulted in the PLCX 224841 never being listed on the Patron Reports that were sent to Queen City Terminals and they were not notified of the tank car's arrival. This initiated a sequence of events leading to the non-delivery of the tank car and subsequent release of the hazardous material.

Contributing to the apparent lack of accountability for lost cars is the railroad has only one operational Automatic Equipment Inventory (AEI) reader in the Cincinnati area, which is located outside of McCullough Yard. The railroad also utilizes manual car counting and inventory procedures to periodically verify yard and track placement of rail cars.

As noted on the railroad's Car Movement History, the term "lost car" is an indicator of when the railroad conducted a physical verification of a yard. If a car is determined to be in the wrong track, it is placed into a lost car status until verified via electronic transmission or physical observation in the yard. At that time, the clerk determines which track to place the car, which is typically completed the same day.

The PLCX 224841 was physically verified and repositioned in McCullough Yard three times during a six week period, before being forwarded to Undercliff Yard on March 12, 2005, awaiting delivery to the consignee. On September 20, 2005, and again on January 19, 2006, interviews of the IORY local train crew and the train master showed conclusively that the car was at Undercliff Yard since March 12, 2005.

On September 20, 2005, and again on January 19, 2006, interviews with the local train crew and the Train Master were conducted. The train crew's engineer noted seeing the PLCX 224841 sitting at Undercliff Yard and notifying the IORY's Train Master and the "Customer Service Department" on two occasions, but the

"Customer Service Department" responded that they were awaiting orders from the consignee for delivery. The Train Master confirmed the reports made by the train crew.

The results of the investigation show that a series of clerical errors and the failure of the "Customer Service Department" to follow up on reports from the consignee and the local train crew contributed to the non-delivery of PLCX 224841 and the subsequent loss of contents from the car.

Probable Causes and Contributing Factors:

The probable cause of the incident was the depletion of the inhibiting agent Tertiary Butylcatechol within the Styrene Monomer, Stabilized, due to the excessive amount of time in transportation and uncontrolled storage. The depletion of the inhibiting agent resulted in the uncontrolled polymerization of the Styrene Monomer, Stabilized, within tank car PLCX 224841, resulting in the subsequent venting and loss of contents through the tank car safety relief valve. Contributing factors in the incident were as follows:

1) The failure of IORY personnel to enter the correct RWC into the computer system's "Primary Waybill Detail" screen. Even after the mistake was identified, sufficient action was not taken by the IORY to ensure delivery of PLCX 224841 to the consignee.

2) Queen City Terminals failed to maintain a proper inventory or tracking system, which could have identified that PLCX 224841 was lost in transit.

3) Westlake Sulphur LP failed to maintain a proper inventory or tracking system, which could have identified that PLCX 224841 was lost in transit