



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 20, 1990

In reply refer to: P-90-22 and -23

Mr. Anthony J. Andrukaitis
Vice President
Calnev Pipe Line Company
Suite 202
412 West Hospitality Lane
San Bernardino, California 92412

About 7:36 a.m., Pacific daylight time, on May 12, 1989, Southern Pacific Transportation Company (SP) freight train 1-MJLBP-111, which consisted of a four-unit locomotive on the head end of the train, 69 hopper cars loaded with trona, and a two-unit helper locomotive on the rear of the train, derailed at milepost 486.8, in San Bernardino, California. The entire train was destroyed as a result of the derailment. Seven homes located in the adjacent neighborhood were totally destroyed and four others were extensively damaged. Of the five crewmembers onboard the train, two on the head end of the train were killed, one received serious injuries, and the two on the rear end of the train received minor injuries. Of eight residents in their homes at the time of the accident, two were killed and one received serious injuries as a result of being trapped under debris for 15 hours. Local officials evacuated homes in the surrounding area because of a concern that a 14-inch pipeline owned by the Calnev Pipe Line Company, which was transporting gasoline and was located under the wreckage, may have been damaged during the accident sequence or was susceptible to being damaged during wreckage clearing operations. Residents were allowed to return to their homes within 24 hours of the derailment.

About 8:05 a.m., on May 25, 1989, 13 days after the train derailment, the 14-inch pipeline ruptured at the site of the derailment, released its product, and ignited. As a result of the release and ignition of gasoline, 2 residents were killed, 3 received serious injuries, and 16 reported minor injuries. Eleven homes in the adjacent neighborhood were destroyed, 3 received moderate fire and smoke damage, and 3 received smoke damage only.

In addition, 21 motor vehicles were destroyed. Residents within a four-block area of the rupture were evacuated by local officials.¹

The investigation revealed that on the morning of the pipeline rupture, the pipeline dispatcher on duty received both a low suction and a low discharge pressure alarm on his terminal screen. However, the dispatcher apparently did not observe the low discharge pressure alarm. Furthermore, by one stroke on his terminal keyboard, he silenced the audible alarm and deactivated the flashing alarm. However, the dispatcher's failure to notice the low discharge pressure alarm and his attempts to restart the pumps had no substantial effect on the amount of product discharged because the computer monitoring system promptly recognized the low discharge pressure and shut down the pumps. After the pipeline rupture, Calnev installed a high flow set point whereby if excessive flow is experienced on the pipeline, the system will automatically shut down. Calnev also revised the emergency response manual to advise the dispatchers of the actions to take when receiving both a low discharge and a low suction pressure alarm. The Board believes, however, that the dispatcher should be required to acknowledge individually each alarm received or that a second dissimilar sounding alarm denoting multiple alarm conditions should be added to the system.

Because more than 9,400 barrels of gasoline were required to refill the pipeline, with 1 mile of pipeline holding 917.69 barrels of product, it was evident that the check valve at MP 6.9 failed to close when the pipeline ruptured and the check valve at MP 14.9 did not close completely. The 4.3- to 8.0-mile spacing of the four check valves along this segment of pipeline would probably have lessened the severity of this accident had the valves worked properly. The check valves installed in the pipeline should have closed when the gasoline at higher elevations began to flow to the rupture site and less than 100 barrels (about 4,000 gallons) of gasoline should have been released. However, the investigation revealed that the check valves had not been inspected and closed to determine if they functioned properly in the 19 years since they were installed, nor were they required by Federal safety regulations to have been installed, tested, or inspected.

Following the train derailment, Calnev's plan of action to lower the pressure in the pipeline was prudent and appropriate to ensure that an immediately dangerous condition did not materialize. However, the problems that Calnev experienced in attempting to lower the pressure in the pipeline should have raised some concern about the proper functioning of the check valves in the pipeline between Colton and Cajon Pass. Had Calnev considered that its inability to lower the pressure in the pipeline may have resulted from other than an inadequate rate of product withdrawal, the company then may have recognized that malfunctioning check valves could produce the conditions it was experiencing. Such recognition would not have altered Calnev's capability to further lower the pressure in the pipeline during the

¹For more detailed information, read Railroad Accident Report-- "Derailment of Southern Pacific Transportation Company Freight Train on May 12, 1989, and Subsequent Rupture of Calnev Petroleum Pipeline on May 25, 1989, at San Bernardino, California" (NTSB/RAR-90/02).

wreckage clearing operations; however, it would have alerted Calnev to determine the status of its check valves before again restarting pumping operations.

The All-Clear check valve does not incorporate in its design a means to determine the position of the valve clapper as do many conventional check valves. Calnev, however, could have excavated one of these valves that was equipped with bypass connections, installed pressure gauges to monitor the pressure on each side of the valve, and then withdrawn product from the upstream connection and monitored the pressures to assess the functioning of the clapper. Alternatively, Calnev could have excavated the check valve at MP 6.9, installed a product withdrawal tap upstream of the check valve and pressure monitoring taps on each side of the check valve, and then withdrawn product from the pipeline and monitored the pressure on each side of the check valve to assess the functioning of the clapper.

As a result of the apparent failure of two or more of the side-hinged check valves, Calnev and the Research and Special Programs Administration (RSPA) entered into an agreement calling for Calnev to inspect these check valves and to subject at least two to examination to determine why they did not function properly. Since the accident, Calnev has inspected three check valves--at pipeline MP 6.9, MP 19.2, and MP 25.7. All check valves thus far inspected were found stuck in the open position. Calnev has removed the check valves at MP 19.2 and 25.7 and plans to remove the check valve at the Colton Terminal. These valves were subjected to OPS-approved operational tests. Calnev has installed top-hinged check valves equipped with a clapper position indicator to replace the check valves removed and plans to install similar check valves adjacent to all of the side-hinged check valves remaining in the pipeline.

Therefore, the National Transportation Safety Board recommends that the Calnev Pipe Line Company:

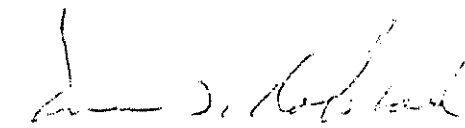
Enhance the computerized operating system by requiring the dispatcher on duty to acknowledge individually each alarm received or by adding a second dissimilar sounding alarm denoting multiple alarm conditions. (Class II, Priority Action) (P-90-22)

Provide a means for testing all mainline check valves to determine that they function properly and test these valves annually. (Class II, Priority Action) (P-90-23)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "... to promote transportation safety by conducting independent accident investigations and formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations P-90-22 and -23.

Also, the Safety Board issued Safety Recommendations R-90-12 through -21 to the Southern Pacific Transportation Company; R-90-22 through -25 to the Federal Railroad Administration; R-90-26 and -27 to the Association of American Railroads; I-90-18 and -19 to the City of San Bernardino; P-90-24 and -25 to the Research and Special Programs Administration; and I-90-20 to the National Association of Counties and the National League of Cities. The Safety Board also reiterated Safety Recommendations P-84-26, P-87-6, P-87-7, and P-87-22 to the Research and Special Programs Administration; and R-89-50 to the Federal Railroad Administration.

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER and BURNETT, Members, concurred in these recommendations.



By: James L. Kolstad
Chairman