



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

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In reply refer to: P-89-5 and -6

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On May 12, 1989, a Southern Pacific Transportation Company (SP) freight train derailed in San Bernardino, California, with portions of the engines and rail cars coming to rest over a 14-inch products pipeline being operated by Calnev Pipe Line Company (Calnev) in excess of 1,600 psig. After learning of the derailment, Calnev personnel stopped pumping product through the pipeline. Pressure in the pipeline near milepost 6.8, the area of the derailment, was reduced to about 1,100 psig when the pumps were shut down; however, Calnev personnel desired to reduce the pressure to about 300 psig to provide greater safety in the event that its pipeline had been damaged.

To reduce the pressure, Calnev personnel removed about 120 barrels of product from the pipeline at its Colton Pump Station (Colton) at Milepost Post (MP) 0+00, and this resulted in a 60-psig pressure reduction both at Colton and at a pressure monitoring point located at Cajon Pass (MP 0+28), which is at an elevation of 3,440 feet above Colton. Since the pressure dropped at both locations, Calnev personnel were aware that the check valves in the pipeline between these two points were not closed. Again Calnev personnel removed 120 barrels of product at Colton in an attempt to close the check valves so that pressure could be reduced in the area of the derailment. Again the pressure dropped about 60 psig both at Colton and at Cajon Pass. The third withdrawal of product resulted in pressure being reduced to about 800 psig at Colton, but again pressure was reduced at both locations. It was believed that the check valves would not close because the rate of withdrawal of product from the pipeline was too low. Calnev personnel determined that the pressure now at Colton likely was the result of the static pressure of the product in the line and that further reduction was not practical as this would require the removal of a large quantity of product from the pipeline.

Calnev personnel performed a limited number of excavations to inspect the pipeline at locations they believed the greater chances of damage from the derailment existed. Although some portions of the derailed train were found in the excavations below ground level, none were found nearer to the pipeline than 3 feet. No internal pipe inspections or hydrostatic tests were performed before returning the pipeline to maximum operating pressure nor were any required by the Research and Special Programs' Office of Pipeline Safety (RSPA) which monitored the pipeline inspection activities through its agent, the California State Fire Marshal. [The RSPA now has established a policy that any pipeline potentially damaged by an accident, such as a train derailment, will be excavated in the areas of potential impingement, inspected for damage with any damage found being repaired, backfilled, and then successfully hydrostatically tested before the pipeline can be returned to service.]

At 8:05 a.m. on May 25, 1989, Calnev's 14-inch products pipeline ruptured in the area of the May 12, 1989, SP derailment releasing gasoline which sprayed over houses in the adjacent neighborhood and ignited. Gasoline fed the fires until they were extinguished about 10:00 p.m. Two persons were killed, 31 persons were injured, 10 houses were destroyed, 5 houses were extensively damaged, and 18 automobiles were destroyed. Additionally, about 1,000 people were evacuated during the emergency response activities. Later, Calnev personnel inspected the check valve in the 14-inch pipeline at milepost 0+06.9 (about 0.1 mile north of the rupture) and found it in the fully open position. No debris or other reason was evident for the clapper of the check valve not to be closed, but considerable force was required to close the clapper.

After replacing the pipe in the area of the rupture, Calnev installed a valve just upstream of the check valve at MP 0+0.9 and about 9,400 barrels of product were required to refill the pipeline. For this 14-inch pipeline, that quantity of product would fill 10.24 miles of pipe indicating that after the rupture, gasoline from beyond the check valve at MP 0+14.9 had flowed downhill to the site of the rupture. Consequently, the check valve at MP 0+14.9 did not close to prevent the back flow of gasoline. Because Calnev personnel were unable to reduce the pressure in the pipeline on May 12, 1989, after the derailment and experienced the same reductions in pressure at Colton (MP 0+00) and at Cajon Pass (MP 0+28), it appears that the check valve at milepost 25.7 also did not function properly.

While Calnev has many check valves installed in its pipelines, each of the check valves in question are 14-inch "All-Clear Check Valves," Model ACB-976 that were manufactured by the Wheatley Company. The clapper in these valves is hinged on the side rather than at the top as is usual. Calnev has not previously experienced a release of product or other circumstance that would provide an indication that these valves ever functioned properly to prevent back flow of product in the pipeline. Calnev also has never performed any maintenance on or operational tests of these valves since the pipeline began operations in 1970 even though these

sidehinged check valves provide the only automatic protection against product flowing downhill into populated areas in and near San Bernardino, California, should an undesired opening, such as a rupture, occur.

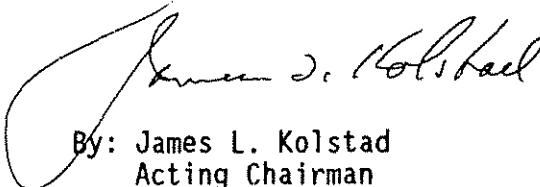
Title 49 CFR 195.420, Valve maintenance, requires the pipeline operator to maintain in good working order at all times each valve necessary for the safe operation of its pipeline and to inspect each mainline valve twice each year to determine that it is functioning properly. Since the term "valve" is not defined in section 192.2, Definitions, or otherwise defined in Part 195, Transportation of Hazardous Liquids by Pipeline, it is not clear whether the inspection and maintenance provisions for valves apply to check valves. However, Calnev obviously has not interpreted this requirement as applying to its check valves, and since no actions have been taken against Calnev for failure to inspect and maintain these valves, it would appear that RSPA's inspectors also do not consider these requirements to apply to check valves.

Therefore, the Safety Board recommends that the Research and Special Programs Administration:

Require pipeline operators that have "All-Clear Check Valves" manufactured by the Wheatley Company installed in their pipeline systems to test these valves for proper closure and require the replacement of any that fail to close properly. (Class I, Urgent Action)(P-89-5)

Establish inspection, maintenance, and test requirements to demonstrate and maintain the proper functioning of check valves installed in pipeline systems. (Class II, Priority Action)
(P-89-6)

KOLSTAD, Acting Chairman, BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.



By: James L. Kolstad
Acting Chairman