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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 31, 1981

Forwarded to:
Mr. R. J. Chamberlin
President and Director
Four Corners Pipe Line Company
5900 Cherry Avenue
Long Beach, California 90806

SAFETY RECOMMENDATION(S)

P-81-23 through -28

About 6:25 p.m., on December 1, 1980, a pipeline transporting naphtha ruptured under the road at the intersection of 28th Street and Gale Avenue in Long Beach, California. Escaping product under high pressure blew a hole through the pavement and sprayed into the air up to 20 feet and then flowed into the gutters. Moments later, the product ignited by an undetermined source. The ensuing flames reached a height of approximately 70 feet. As a result of the fire, 5 persons were injured, 1 house was destroyed, 11 houses sustained moderate to severe damage, and 11 motor vehicles were destroyed. 1/

Line No. 8 ruptured because the pipeline was closed at its two delivery points (Marlex and Watson) while the rotary pumps at both shipping points (Aminoil and Union Oil) continued to operate at increasingly higher pressures until the pipeline failed at its weakest point, an area thinned by previous corrosion. The Four Corners dispatchers, who were responsible for monitoring and controlling the operation of all of the Four Corners lines under their jurisdiction, had inadequate control over line No. 8 because they had no direct information on the operating condition of the line.

The dispatchers at the Four Corners control center lacked the instrumentation to tell the pressure and flow rates on the pipeline, whether the pumps were on or off, or whether the amount of crude oil entering the pipeline was equal to the amount being delivered. The dispatchers did not know that line No. 8 had failed until the spilled product had been sampled and they were able to conclude it was the same as the line was transporting.

The line had a similar failure in the same area 3 months before this accident when a pipe section split after a pump had been activated against a closed line. The operational error in the September leak was essentially the same as the December rupture, but the hazard to the public was considerably less. The decision to transport naphtha through an old pipeline with inadequate controls for proper operation by the dispatcher was a poor one in terms of the risks to the public.

1/ For more detailed information, read Pipeline Accident Report—"Four Corners Pipe Line Company, Pipeline Rupture and Fire, Long Beach, California, December 1, 1980" (NTSB-PAR-81-4).

Despite the fact that the stream of crude oil from Huntington Beach was diverted through valve 2793 into Marlex and that valve 2794 was closed after the accident, naphtha continued to flow from the ruptured pipe for approximately 2 hours. This flow resulted from line drainage which occurred because valves on either side of the rupture were not immediately closed and because the leak site was 80 feet lower than the pipeline high point at Signal Hill.

Four distinct failures of communications were identified as contributing to the delay in stopping the flow of product into the accident area.

- o The initial call from the Long Beach Fire Department dispatcher was a request that all pipeline operators "shut down" their lines in the vicinity of 28th Street and Gale Avenue. The control center was misinformed that the cause of the fire was a possible overturned tank truck, and no mention was made of a pipeline rupture. No one took any steps to correct this erroneous report. At the time, no one knew that line No. 8 had ruptured.
- o The initial request that all pipelines be shut down probably was interpreted to mean that the pumping lines in the area should be stopped, not that the accident site should be isolated by closing valves. The Four Corners dispatcher did not know that one of its lines was involved in the accident until more than 1 hour after the rupture.
- o Once the Four Corners gaugers reported to the control center at 7:55 p.m. that the API gravity of the product at the fire scene was the same as the naphtha which had been shipped over line No. 8, isolation of the fire by closing the nearby valves was a logical step. However, the Four Corners dispatchers did not direct the closure of valve 1644 until 8:40, 45 minutes after the line failure was verified and over 2 hours after the line had ruptured perhaps because they did not take into account the topography of the line and that the closure of valve 2794 alone would shut off the line to Watson completely. The 80 foot elevation between Signal Hill and the accident site allowed the line full of naphtha to drain from the rupture virtually unchecked.
- o The Four Corner C&M foreman stated that he arrived at the accident site about 8:00 but he was unaware that the ruptured pipe was the No. 8 line until about 12:00 p.m., 4 hours later. If there had been effective communications between him, the dispatcher, and the Four Corners gauger, it might have occurred to him to close the downstream valves (1970 and 1971) and possibly the upstream valves (1642 and 1644) earlier.

Although none of the above would have prevented the pipeline from overpressurizing, improved communication between the parties involved in this accident might have stopped the flow of naphtha sooner and, therefore, would have reduced the property damage. These actions also would have reduced the fire department's efforts.

The December 1, 1980, accident also indicates the need for closer supervision at the Aminoil and Union Oil facilities of the maintenance of safety devices on the pumping units. The failure of one high pressure shutdown switch at Aminoil and the excessively high setting of the pressure shutdown switch at Union Oil demonstrates why those devices should have been checked regularly by the shippers. In addition, Four Corners personnel

should have given more attention to maintaining the pressure recording device at the Union Oil facility; had they done so, they might have been alerted to earlier overpressures and might have rectified them.

The control room dispatchers had approximately 12 weeks' on-the-job training and no classroom training. The training consisted of working alongside a senior dispatcher to acquire the necessary familiarity with the control center equipment and, thereafter, control and monitor approximately 1,500 miles of pipeline ranging from 4 to 42 inches in five western States.

As a result of its investigation, the National Transportation Safety Board recommends that the Four Corners Pipe Line Company:

Develop written procedures for handling suspected pipeline leaks and train its personnel so that these procedures are followed accurately and expeditiously. (Class II, Priority Action) (P-81-23)

Establish, in addition to the on-the-job-training, a formal training program for dispatchers, including periodic qualification tests in pipeline dispatching operations. (Class II, Priority Action) (P-81-24)

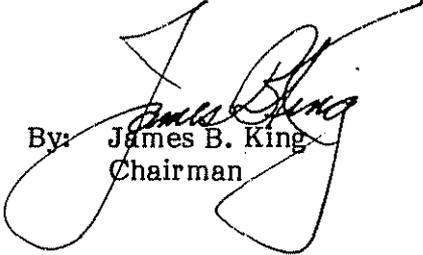
Expedite the inclusion of line No. 8 into the Four Corners supervisor control and surveillance system so that it can be completely controlled and monitored from the control center, and limit the use of line No. 8 to low volatility material until the line is modified. (Class II, Priority Action) (P-81-25)

Establish maximum delivery pressures into line No. 8 and direct its shippers (Union, Aminoil, and others) not to exceed this pressure when pumping into the system. (Class II, Priority Action) (P-81-26)

Require its employees to change and set correctly the recording charts for pressure and flow data and to monitor these charts on a continuing basis. (Class II, Priority Action) (P-81-27)

Revise the maintenance and repair procedures to indicate the removal of the full length of pipe when replacing longitudinal seam failures. (Class II, Priority Action) (P-81-28)

McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations. KING, Chairman, and DRIVER, Vice Chairman, did not participate.

By: 
James B. King
Chairman