



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: SEP 11 1996

In Reply Refer To: P-96-21

Honorable D.K. Sharma
 Administrator
 Research and Special Programs Administration
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In mid-October 1994, serious flooding occurred in the San Jacinto River flood plain near Houston, Texas, forcing over 14,000 people to evacuate and resulting in 20 deaths. Due to the flooding, eight pipelines ruptured and many others were undermined. More than 35,000 barrels of petroleum and petroleum products were released into the river. Ignition of the released products resulted in 547 people receiving (mostly minor) burn and inhalation injuries. Spill response costs exceeded \$7 million, and estimated property damage losses were about \$16 million.

The National Transportation Safety Board undertook a special investigation¹ to assess: (1) the adequacy of Federal and industry standards on designing pipelines in flood plains, (2) the preparedness of pipeline operators to respond to threats to their pipelines from flooding and to minimize the potential for product releases, and (3) the preparedness of the Nation to minimize the consequences of petroleum releases. The investigation report also addressed the need for effective operational monitoring of pipelines and for the use of remote- or automatic-operated valves to allow for prompt detection of product releases and rapid shutdown of failed pipe segments. The Safety Board made nine safety recommendations — one to the Research and Special Programs Administration (RSPA), five to the National Response Team, and one each to the American Petroleum Institute, the Association of Oil Pipe Lines, and the Interstate Natural Gas Association of America.

In its investigation of the Houston accident, the Safety Board found that the many pipeline operators affected by the flood responded to their similar failures of pipelines crossing the flood plain with considerably different strategies. On learning of the failures, a few operators

¹For further information, read Special Investigation Report—*Evaluation of Pipeline Failures During Flooding and of Spill Response Actions, San Jacinto River Near Houston, Texas, October 1994* (NTSB/SIR-96/04).

elected to shut down operations, but left products under pressure and valves open in the shutdown pipelines. Some shut down operations, closed valves, and purged the pipelines of products. One operator continued operations for a time, but posted employees at valves near the river crossing to be prepared to close them should a rupture occur. Other operators continued operations as usual, though they were aware of several failures of pipelines across the flood plain. Most operators of pipelines crossing the San Jacinto River flood plain continued operations without evaluating the capability of the pipeline design to withstand the threats presented by the flood. Few operators took effective response actions during the San Jacinto flood to minimize the potential for product releases.

The Secretary of Transportation is responsible for fulfilling the provisions of the Oil Pollution Act of 1990 (OPA 90) as they relate to operators of onshore pipelines. Acting on behalf of the Secretary, on January 5, 1993, RSPA issued 49 Code of Federal Regulations Part 194, *Response Plans for Onshore Oil Pipelines*. Plan requirements apply to operators of onshore oil (natural gas, highly volatile liquids, and carbon dioxide pipelines are not included) pipelines that, because of their locations, could reasonably be expected to cause significant and substantial harm to the environment by discharging oil into or on any navigable waters or adjoining shorelines. Among other requirements, and with few exceptions, Part 194 requires operators of affected pipelines to submit to RSPA a response plan that defines the operator's planned resources for responding, to the maximum extent practicable, to a (1) worst-case discharge and (2) substantial threat of such a discharge.

To assist operators in complying with the planning requirement, RSPA set forth a recommended format for operators to use in preparing their plans. RSPA also met with groups of operators, provided examples of "best practices," and communicated in writing and by telephone with operators to assist them in preparing acceptable response plans. After operators submitted response plans to RSPA, its staff and contract personnel compared the plan content against a checklist developed to assist them in quickly identifying plans that did not contain all required sections or that did not include all required information. When a plan did not pass this initial completeness check, RSPA notified the operator of the items omitted. Plans passing the completeness check were reviewed in detail to assess whether the plan adequately addressed required response issues, such as procedures, notifications, equipment and materials, and training. Operators of plans found unacceptable were notified of noncomplying provisions.

In the course of this investigation, Safety Board staff examined the response plans prepared by 10 pipeline operators, including the plans of all those operators whose pipelines failed during the 1994 San Jacinto flood. The examinations revealed that all but one operator conditioned the implementation of response actions on its becoming aware of an actual release of product from its pipeline. Responding to a substantial threat of a release was not addressed. The plan of one operator included plans for responding to substantial threats of discharges, and cited preparations and actions to take in the event of earthquakes, hurricanes, tornadoes, bomb threats, etc., but flooding was not included. Safety Board staffers considered that, had the plans included the required OPA 90 elements, the responses of the liquid pipeline operators to the flood and pipe failures should have been reasonably uniform.

RSPA staff advised Safety Board staff that they had not informed operators during the plan development phase that their plans must include provisions on responding to events that might pose a substantial threat of pipeline discharge. RSPA staff stated that they had focused their reviews on an operator's ability to respond to an actual release of oil, and acknowledged that they had not examined the plans to confirm that they contained provisions on responding to substantial threats of discharge. With respect to the San Jacinto accident, therefore, the Safety Board concluded that pipeline operators would have been more likely to have implemented early shutdown and/or purging of products from pipe segments crossing the San Jacinto flood plain had RSPA required them to develop plans for responding to substantial threats of a pipeline failure and product discharge.

RSPA staffers have stated that they intend, after the Safety Board issues its report on the 1994 pipeline ruptures at Houston, Texas,² to send a letter to all plan holders reminding them of the importance of being prepared to respond to a substantial threat of a worst-case discharge, even in the absence of an actual release. RSPA staff have also stated that RSPA will conduct a public meeting in fall 1996 to receive comments on changes required in Part 194 to meet OPA 90 requirements.

The Safety Board recognizes that RSPA's failure to ensure accomplishment of the OPA 90 objectives was an oversight. However, it does not view as sufficient the means proposed by RSPA staff to remedy the error. RSPA must do more than send each operator a letter advising that the operator must be prepared to respond to substantial threats to its pipelines. Recognizing potential threats to pipeline failures and developing means to remedy or minimize such threats require actions significantly different from those needed to develop product cleanup processes.

Consequently, for RSPA to cause each operator to recognize and be prepared to respond to substantial threats of product discharges, it must require operators to identify events most likely to pose substantial threats to their pipelines. In so doing, each operator should be able to compare the forces that might be imposed on its pipeline, weigh those forces against the design capabilities of its pipeline, and identify locations where the potential for damage is greatest. Based on such evaluation, the operator would be able to develop action plans to remedy or minimize the identified threats. The Safety Board considers that it should be possible to have such plan modifications completed within a year.

The need to improve public safety by requiring effective monitoring of pipelines and remote-controlled or automatic closing valves to rapidly detect and stop the release of hazardous

² NTSB/SIR-96/04

materials from ruptured pipelines has been consistently addressed in Safety Board reports.³ In this case too, the lack of effective operational monitoring and of remote- or automatic-operated valves prevented pipeline operators from rapidly detecting and stopping the release of products, which permitted the release of large volumes of products. The pipeline ruptures and releases, and threats of additional ruptures, experienced during the San Jacinto flood further support the necessity for improvements in this regulatory area to minimize the volume of hazardous materials released when pipelines fail.

The RSPA Administrator stated on October 25, 1994, that it was essential to liquid pipeline safety that his Administration implement rulemaking on requirements for valves and leak detection systems for liquid pipelines. He further stated that such action should be completed by December 1995. However, that rulemaking action remains far from complete. The Safety Board concurs with the RSPA Administrator on the need to improve the ability to rapidly shut down failed liquid pipelines and urges RSPA to expedite completion of the rapid detection and shutdown objectives called for in Safety Recommendations P-87-22, P-91-1, and P-95-1.⁴ Failed liquid pipelines continue to release excessive volumes of petroleum and liquid products into the environment because RSPA has not established requirements for rapid detection and shutdown of failed pipe segments, and the liquid pipeline industry has not incorporated means for rapidly detecting, locating, and shutting down failed pipe segments.

Based on the foregoing information, the National Transportation Safety Board recommends that the Research and Special Programs Administration:

Require operators of liquid pipelines to address, in their Oil Pollution Act of 1990 spill response plans, identifying and responding to events that can pose a substantial threat of a worst-case product release. (Class II, Priority Action) (P-96-21)

The Safety Board also issued Safety Recommendations I-96-1 through -5 to the National Response Team and Safety Recommendations P-96-22 through -24 to the American Petroleum Institute, the Association of Oil Pipe Lines, and the Interstate Natural Gas Association of America, respectively.

³Pipeline Special Study--*Special Study of Effects of Delay in Shutting Down Failed Pipeline Systems and Methods of Providing Rapid Shutdown, December 30, 1970* (NTSB/PSS-71/01); Pipeline Accident Report--*Phillips Pipe Line Company Propane Gas Explosion, Franklin County, Missouri, December 9, 1970* (NTSB/PAR-72/01); Pipeline Accident Report--*Mid America Pipeline System Liquefied Petroleum Gas Pipeline Rupture, West Odessa, Texas, March 15, 1983* (NTSB/PAR-84/01); Pipeline Accident Report--*William's Pipe Line Company, Liquid Pipeline Rupture and Fire, Mounds View, Minnesota, July 8, 1986* (NTSB/PAR-87/01); Railroad Accident Report--*Derailment of Southern Pacific Freight Train on May 12, 1989, and Subsequent Rupture of Calnev Pipeline on May 25, 1989, San Bernardino, California* (NTSB/RAR-90/02); Pipeline Accident Report--*Liquid Propane Pipeline Rupture and Fire, Texas Eastern Products Pipeline Company, North Blenheim, New York, March 13, 1990* (NTSB/PAR-91/01); Pipeline Accident Report--*Texas Eastern Transmission Corporation Natural Gas Pipeline Explosion and Fire, Edison, New Jersey, March 23, 1994* (NTSB/PAR-95/01); and Special Investigation Report--*Evaluation of Accident Data and Federal Oversight of Petroleum Product Pipelines* (NTSB/SIR-96/02).

⁴Safety Recommendation P-95-1 was reiterated earlier this year in NTSB/SIR-96/02.

The Safety Board is 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 recommendation in this letter. Please refer to Safety Recommendation P-96-21. If you require additional information, you may call (202) 382-0672.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By: 
Jim Hall
Chairman