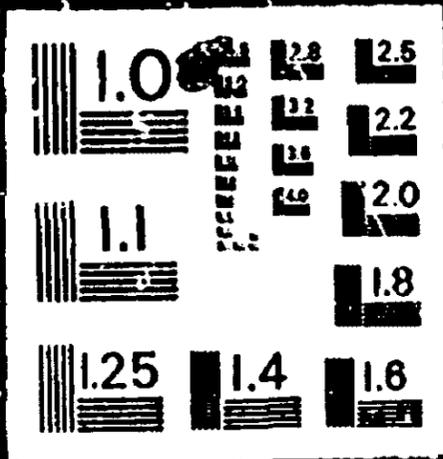


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**U.S. DEPARTMENT OF COMMERCE
National Technical Information Service**

PB80-102189

**Safety Report on the Progress
of Improvements in Pipeline
Transportation of Highly Volatile Liquids**

(U.S.) National Transportation Safety Board, Washington, DC

28 Sep 79

P880-102189



NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

SAFETY REPORT

ON THE PROGRESS OF
IMPROVEMENTS IN PIPELINE TRANSPORTATION
OF HIGHLY VOLATILE LIQUIDS

NTSB-SR-79-3

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

UNITED STATES GOVERNMENT



01/2/10

309108	33 27 4A	HCKV	PP 80-102 189
			13B, 13L,
			13E, 85D

* Hazardous materials,
 * Pipeline transportation,

Safety engineering,
 Liquefied petroleum gases,
 Accident investigations,
 Standards,
 Regulations,
 Ammonia.

* Hazardous materials transportation,
 * Volatile liquids,
 Anhydrous ammonia.

HAZ ABSTRACT

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BATCH: 32303S

B1- CONTROL NUMBER: U309108

OPERATORS:

01)ACCESSION NUMBER:PB80-102189

02C)COMMERCE CATEGORY:

03S)ADDITIONAL S&C CLIENTS: / / / /

03L)LANGUAGE:

03C)COMP. ENTRY CODE:

34)SERIAL:

35)CORPORATE AUTHOR CODE: 022327004

US-AUTHOR: 1

05)National Transportation Safety Board, Washington, DC. Office of Evaluations and Safety Objectives.¢

06)Safety Report on the Progress of Improvements in Pipeline Transportation of Highly Volatile Liquids.¢

09)Safety rept. 28 Sep 79,¢

11)28 Sep 79,¢

14 IAC) NTSB/SR-79/3¢ *uM*

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB-SP-79-3	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Safety Report on the Progress of Improvements In Pipeline Transportation of Highly Volatile Liquids		5. Report Date September 28, 1979	
		6. Performing Organization Code	
7. Author(s)		8. Performing Organization Report No.	
9. Performing Organization Name and Address National Transportation Safety Board Office of Evaluations and Safety Objectives Washington, D.C. 20594		10. Work Unit No. 2754	
		11. Contract or Grant No.	
12. Sponsoring Agency Name and Address NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594		13. Type of Report and Period Covered Safety Report September 28, 1979	
		14. Sponsoring Agency Code	
15. Supplementary Notes			
16. Abstract The most hazardous liquid products transported by pipelines are highly volatile liquids (HVL), such as liquefied petroleum gas and anhydrous ammonia. Since the Safety Board began investigating HVL pipeline accidents in 1970, it has issued a total of 19 recommendations to the Department of Transportation (DOT) urging adoption of improved safety requirements for these pipelines. In FY 1979 the Safety Board, concerned that needed improvements either have not been implemented or have not been implemented as rapidly as possible, established a safety objective for improved safeguards for HVL pipelines. The objective was twofold, designed to: 1) Demonstrate the need for improvements, and 2) obtain the commitment of DOT's Materials Transportation Bureau (MTB) to implement standards recommended by the Safety Board. As a result of the Safety Board's accident investigation and safety objective activities, MTB has proposed or adopted new HVL pipeline safety standards which will, when fully implemented, substantially reduce the probability of accidents and the risk of casualties and property losses. However, reduction of the remaining risks to the public safety will require further action by MTB to: 1) Expedite implementation of proposed safeguards; 2) establish safety requirements based upon the population which may be exposed to harm; and 3) establish minimum performance requirements for the prompt detection and rapid isolation of failed sections of HVL pipelines.			
17. Key Words Pipeline; liquid pipeline; highly volatile liquid (HVL); hazardous materials; safety standards; regulations; Materials Transportation Bureau; system design; rapid shutdown; liquefied petroleum gas (LPG); natural gas liquids; anhydrous ammonia; leak detection		18. Distribution Statement This document is available to the public through the National Technical Information Service Springfield, Virginia 22151	
19. Security Classification (of this report) UNCLASSIFIED	20. Security Classification (of this page) UNCLASSIFIED	21. No. of Pages 19	22. Price PCA02/101

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FOREWORD

The mission of the National Transportation Safety Board is to improve transportation safety. This is done by determining the probable causes of accidents through accident investigations and public hearings, through staff review and analysis of accident information, through evaluations of operations, effectiveness, and performance of other agencies, through special studies and special investigations, and through publication of recommendations and reports.

Since its establishment, the Safety Board has been concerned that certain safety problems of national significance have not been addressed as rapidly as possible, even though needed improvements were known, feasible, and timely. Therefore, the Safety Board has begun to identify a number of salient problems each year and to pursue implementation of specific safety improvements. One of these safety objectives during fiscal year 1979 was to persuade the Department of Transportation to establish separate, more stringent safety requirements for pipelines that transport highly volatile liquids, as previously recommended by the Safety Board.

This Safety Report outlines Safety Board efforts to stimulate implementation of safety improvements, describes progress made toward safer pipeline transportation of highly volatile liquids, and identifies an additional problem.

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D.C. 20594

Adopted: September 28, 1979

**SAFETY REPORT ON THE PROGRESS OF IMPROVEMENTS
IN PIPELINE TRANSPORTATION OF HIGHLY VOLATILE LIQUIDS**

BACKGROUND

Pipelines offer the most economical and generally the safest method for long-distance transportation of liquid products which are essential to our economy, but which also are hazardous when inadvertently released. The most hazardous liquid products transported by pipeline, such as liquefied petroleum gas and anhydrous ammonia, are classified as highly volatile liquids (HVL). ^{1/} Pipelines transporting HVL now pass through or near densely populated areas in most States.

Although pipeline transportation systems have a good record for safety, the economies of scale which make pipeline transportation feasible also create the potential for far greater losses of life and property in any single accident. For comparison, an 8-inch pipeline is capable of moving continuously more than 66,000 gallons of a highly volatile liquid past a given point on the pipeline every hour -- a volume equivalent to the capacity of two jumbo rail tank cars or more than six highway tank trucks. The volume of product which can be released in a pipeline accident actually can be much greater than other modes of transportation because of an operator's current limited ability to detect a release and to isolate the release point from the rest of the system. One pipeline accident near Devers, Texas, in 1975, released more than 600,000 gallons of natural gas liquids -- the equivalent of 20 jumbo railroad tank cars or 80 highway tank trucks.

The March 2, 1979, liquefied petroleum gas (LPG) accident in Edmonton in the Canadian province of Ontario also vividly demonstrates the great potential for catastrophe of a pipeline accident. In this incident, 20,000 persons had to be evacuated when gas vapors entered sewer lines and exposed persons up to 8 miles from the rupture. No other land transportation system has a greater potential for catastrophic consequences in a single accident than do pipelines.

^{1/} A highly volatile liquid is defined in 49 CFR 195.2 as ". . . a commodity which will form a vapor cloud when released to the atmosphere and which has a vapor pressure exceeding 276kPa (40 psia) at 37.8° C (100° F)."

SAFETY BOARD EFFORTS TO STIMULATE SOLUTIONS

Since the beginning of 1970, the Safety Board has investigated and analyzed eight serious pipeline accidents which resulted in the release of HVL. Based on these analyses, the Safety Board has issued a total of 18 recommendations urging the adoption of improved safety standards for transportation of HVL by pipeline. (See Appendix L)

The Safety Board's report on the Phillips Pipe Line Company propane gas explosion and fire in Franklin County, Missouri, on December 9, 1970, identified the need for more complete control of the transportation by pipeline of liquefied petroleum gas (LPG). Four recommendations were directed to the Federal Railroad Administrator (FRA), which then had administrative responsibility for safety standards governing these pipelines. ^{2/} These recommendations pertained to the design, construction, and operation of new and existing pipelines; the need to place the longitudinal pipe seams in the upper quadrants of the pipe; the need for remotely or automatically operated valves, and closer valve spacing; and the need to develop safe methods for handling, containing, and disposing of LPG products resulting from pipeline failures.

The Phillips Pipe Line Company natural gas liquids fire, at Austin, Texas, on February 22, 1973, resulted in Safety Board recommendations to the OPS that it (1) expedite action on previous Safety Board recommendations calling for revisions to regulations, (2) include in the revisions a requirement that operators establish an educational program to enable customers and the general public to recognize and report LPG gas leaks to appropriate officials, and (3) study the effects of pipe stress concentrations caused by improper weld positioning and improper welding techniques and make necessary changes in existing standards based on the results of this study.

The Safety Board's report of the Mid-America Pipeline System anhydrous ammonia leak at Conway, Kansas, on December 6, 1973, emphasized the need for these pipelines to be included in the standards previously recommended for highly volatile, toxic, or corrosive liquids. The report recommended that anhydrous ammonia pipelines be included in forthcoming rulemaking actions, with particular emphasis on the establishment of standards for maximum allowable operating pressures; valve spacing; remotely or automatically operated valves; methods for handling, containment, and disposal of anhydrous ammonia following an accidental release; pressure recording instruments; system maps; and implementation of public education programs.

^{2/} In 1975, the responsibility for regulating the safety of transportation of hazardous liquids by pipeline was transferred from the Federal Railroad Administration (FRA) to the Department of Transportation's Office of Pipeline Safety (OPS), under the Office of the Assistant Secretary for Environmental, Safety and Consumer Affairs. In a 1975 reorganization, OPS became the Office of Pipeline Safety Operations (OPSO), in the newly created Materials Transportation Bureau (MTB). In 1977, OPSO became the Office of Pipeline Safety Regulation (OPSR), under MTB, in DOT's Research and Special Programs Administration.

The Safety Board's investigation of the DOW Chemical U.S.A. natural gas liquids explosion and fire near Devers, Texas, on May 12, 1975, resulted in no new recommendations. However, the report pointed out that in two other accidents investigated by the Safety Board the pipeline operator's ability to monitor the system was inadequate. The report again reiterated the need for the Department of Transportation to act on previous Safety Board recommendations.

The Sun Pipe Line Company propane gas pipeline rupture and fire at Romulus, Michigan, on August 2, 1975, again demonstrated the need for improved construction inspections and rapid shutdown capability. Although no new recommendations were made, the Safety Board reemphasized the need for care in excavation to prevent damage to buried pipelines.

The Safety Board's investigation of the Mid-America Pipe Line System liquefied petroleum gas pipeline rupture and fire near Whitharral, Texas, on February 25, 1976, identified the need to evaluate the history of failures on a pipeline to determine when retesting is warranted for maintaining the designed levels of safety. Recommendations were made to the Department of Transportation to study longitudinal weld failures in pipelines and to evaluate the failure history of a specific type and manufacture of pipe.

The Consolidated Gas Supply Corporation propane pipeline rupture and fire at Ruff Creek, Pennsylvania, on July 20, 1977, resulted in the Safety Board recommending expedited publication of a Notice of Proposed Rulemaking (NPRM) to revise pipeline safety regulations as previously recommended by the Safety Board and to (1) include comprehensive regulations on the communications required for safe operation of LPG pipelines, (2) require emergency planning similar to that included in 49 CFR 192.615, and (3) require the inspection of natural gas pipelines for stress corrosion cracking when converted to LPG service.

The Mid-America Pipeline System LPG fire at Donnellson, Iowa, on August 4, 1978, resulted in one recommendation to expedite rulemaking action for HVL pipelines. This accident again demonstrated that many of the problems previously identified by the Safety Board still had not been alleviated.

In 1978, the Safety Board intensified its efforts to stimulate implementation of improved safety standards for HVL pipelines. In June 1978, it adopted improved safety of HVL pipelines as a safety objective. Safety Board members testified at Congressional hearings on pipeline safety to inform legislators of the existence of serious safety problems, to advocate needed corrective actions, and to express concern about the delay in effective regulatory improvements.

Also during 1978, the Safety Board conducted a public hearing on the Donnellson, Iowa, pipeline accident; made presentations on HVL pipeline safety to public and industry groups; conducted a special study of pipeline accident data and published a report of its findings; and reiterated its concerns in its 1978 Annual Report to the Congress.

DEPARTMENT OF TRANSPORTATION RESPONSIVENESS

The Department of Transportation became responsible for the regulation of pipeline safety when it was formed in 1967. ^{3/} Although the Safety Board first identified the need to establish separate, more stringent standards for pipelines transporting HVL in 1972, no immediate action was taken on the Safety Board recommendations.

In 1973 FRA responded favorably to Safety Board recommendations made before that date and indicated that appropriate revisions would be made to the regulations for liquid pipeline transportation. These FRA responses were actually developed by the staff of the OPS because the FRA had no pipeline expertise. The administrative responsibility for liquid pipeline transportation safety was transferred to the OPS late in 1972. The OPS did not advise the Safety Board that there would be a problem in meeting FRA's schedule for rulemaking until 1974 when the OPS awarded contracts for general studies to identify safety problems related to the transportation of HVL by pipeline. With this change in management direction, the OPS revised its rulemaking priorities, and regulatory improvements for HVL pipelines recommended by the Safety Board were postponed until February 1975.

The studies were scheduled to be completed by February 1975. One study was completed ahead of schedule, but the other was not completed until February 9, 1976. The OPSO informed the Safety Board on March 9, 1976, that regulatory action would be delayed until the contract reports were analyzed. This status did not change in OPSO's November 20, 1976, and July 1, 1977, status reports.

On April 3, 1978, Safety Board representatives met with the staff of the MTB to explore the lack of action to develop strengthened safety regulations for HVL pipelines. At this meeting, the MTB staff stated that three NPRM's were to be developed with the first scheduled for release during the first week of May 1978. The proposed regulations were to establish specific requirements for the safe transportation of HVL by pipeline and to strengthen the operating, maintenance, emergency, pressure testing, valve spacing, overpressure control, and other requirements. However, no NPRM on this subject was issued until August 3, 1978. On August 28, 1978 (24 days after the Donnellson, Iowa accident), the MTB released its second of three proposed rulemaking actions to address regulatory deficiencies identified 7 years earlier by the Safety Board. The two NPRM's responded in part to 13 Safety Board recommendations.

^{3/} Changes in administrative responsibility for liquid pipeline safety are detailed in Appendix II.

Lack of priority action on previous recommendations by the MTB prompted the Safety Board to hold a public hearing in September 1978, on the pipeline accident which occurred at Donnellson, Iowa, on August 4, 1978. The pipeline rupture in a rural area released 157,500 gallons of LPG which ignited. Three persons died and two others were critically burned. Additionally, 1 home and 6 outbuildings were destroyed, 2 homes were damaged, and 75 adjacent acres of crops and woods were burned. This was the fourth HVL pipeline accident investigated by the Safety Board during a 5-year period involving the same pipeline operator.

MTB's lack of action regarding previous safety recommendations issued by the Safety Board was questioned during the hearing, but much of the requested information had to be obtained after the hearing because the MTB did not make available the requested management witnesses who were knowledgeable about the reasons for previous OPS/MTB decisions.

MTB witnesses did testify at the public hearing on the Donnellson, Iowa, accident that HVL pipeline safety would be given top priority. ^{4/} One MTB witness, testifying on September 28, 1978, stated:

"The current priorities are such that LNG [liquefied natural gas] is considered to be of the highest priority.

"The area of LNG is expected to be completed some time within the next year. At that time LPG will become the highest priority. I can assure the Board and the public that the Materials Transportation Bureau does intend to continue this commitment in this area. We do not apologize for past actions, but we understand the Board's concern and assure the Board that improvements will be made."

In October 1978, soon after the Donnellson, Iowa, hearing, the Safety Board's Special Study, "Safe Service Life for Liquid Pipelines" ^{5/} was issued. This report analyzed 9 years of accident data collected by the Department of Transportation. The data indicated that only 10 percent of all liquid pipeline accidents involved HVL (291 of 2,881 total), but that 62 percent of all fatalities (34 of 55 total) and 51 percent of all injuries (65 of 127 total) attributed to liquid pipeline operations occurred on pipelines transporting HVL. This finding graphically demonstrated the need for the MTB to develop specific and more stringent pipeline safety regulations. The hazards associated with the transportation by pipeline of all HVL's are similarly sufficient to require comparable measures.

The study also identified deficiencies in the reporting form, administration of the accident reporting program, and uses made of the data collected. Five recommendations were made for improvements in the reporting system. Additionally, a recommendation to expedite rulemaking actions for HVL pipelines was made to reemphasize the need for urgent action.

^{4/} Transcript of Proceedings, NTSB Docket No. DCA-78-AP-021.
^{5/} Report No. NTSB-PSS-78-1, October 12, 1978.

The MTB witnesses at the Donnellson, Iowa, hearing were unable to answer questions about past MTB policies. Therefore, the Safety Board requested that MTB supply the information after the hearing for the record. In response to a question concerning deferral of HVL rulemaking action, MTB responded on December 18, 1978:

"While there was never a formal schedule developed with regard to revising those regulations, Part 195, OPS did on several occasions intend to revise those regulations by certain dates. Since these schedules were never formalized, OPS cannot definitely establish the number of times that such revisions were deferred."

• • •

"The recent reorganization of MTB will focus attention on the development of pipeline safety regulations in a timely manner."

In another response dated January 14, 1979, MTB stated:

"We generally concur with the view expressed by the Safety Board . . . that, based on historical accident rates, LPG presents a greater level of risk than other petroleum products transported by pipeline. This is one reason why our Regulatory Review and Development Plan has assigned top priority to rulemaking activities designed to enhance the safe pipeline transportation of LPG and other highly volatile liquids."

As a result of the public hearing, MTB stated that it would reevaluate all of the Safety Board's outstanding recommendations for improving HVL pipeline safety and consider them for possible future action.

In addition to the rulemaking proposal issued soon after the Donnellson, Iowa, accident, the MTB has taken the following actions to strengthen regulations for HVL pipelines:

1. The third NPRM for HVL pipelines was issued on November 7, 1978, in partial response to five Safety Board recommendations.
2. An Advance Notice of Proposed Rulemaking (ANPRM) was issued on February 1, 1979, requesting comments on means to reduce the potential for accidents on pipelines transporting HVL.
3. The MTB established a schedule for taking final rulemaking action on the three NPRM's issued. Two were scheduled for June 1979, and one for September 1979.

4. On July 6, 1979, MTB issued its first safety regulations directed primarily at improving the safety of HVL pipelines.

The Safety Board reviewed each rulemaking action by the MTB and submitted written comments. The Safety Board suggested that in addition to the requirements proposed by MTB, action be taken to:

1. Apply retroactively requirements for testing all pipelines which were never subjected to hydrostatic strength and leak tests adequate to qualify the pipeline for its maximum operating pressure;
2. Require periodic retesting or internal inspections to verify the physical integrity of the pipeline;
3. Develop and apply retroactively methods for containment, control, and disposal of HVL's which may be released from pipelines;
4. Require for new and existing pipelines means to promptly detect and isolate inadvertent releases of HVL;
5. Require programs to prevent excavation-related damage to buried pipelines;
6. Improve the material toughness properties of pipe to be used; and
7. Develop requirements which would assure that an adequate factor of safety is incorporated in a pipeline segment commensurate with the population at risk, similar to the requirements currently specified for natural gas pipelines.

Implementation of these suggested improvements on existing pipelines will require substantial expenditures by industry. However, the Safety Board believes that the catastrophic potential of HVL pipeline accidents justifies these expenditures to reduce existing risks to public safety. To date, catastrophic public losses have not occurred because the accidents have occurred in rural, relatively remote areas of low population densities.

MTB has not acted in two important areas in which safety improvements are needed. One is the need for application to existing HVL pipeline systems of the safety standards which have been proposed or adopted for new HVL pipeline systems. The second is the need for minimum performance standards for the prompt detection and rapid isolation of failed sections of HVL pipelines.

MTB has failed to require that existing pipelines meet the same minimum safety standards proposed for new pipelines. This will result in a double standard of safety for new and for existing HVL pipelines. Many of the existing HVL pipelines were constructed in areas that were originally rural, but which have become more densely populated as urban centers have expanded.

This same population growth pattern affects the growth in exposure to hazards associated with natural gas pipelines. In its "Minimum Federal Safety Standards for Gas Lines," the MTB recognized the need to at least maintain the prior level of safety afforded by its regulations as exposure of the public to pipeline hazards has increased. The MTB specifies a minimum level of safety for gas pipelines dependent upon the public exposure and requires that established safety levels be maintained even if this may require substantial modifications to the pipeline or even its discontinuance. Currently, for HVL pipelines there are no equivalent provisions for maintaining the level of safety as population exposure increases beyond the design considerations employed when the pipelines were constructed.

Response by the Safety Board and others to the MTB's August 28, 1979, NPRM that proposed installation of automatic or remotely operable control valves highlighted the needs for the proposed standard to be based upon the exposed population and for the standard to apply retroactively. However, some responders argued that the spacing of these control valves would have no appreciable effect upon the loss potential due to a pipeline rupture. These comments have caused the MTB to reevaluate its rulemaking proposal and to issue, on September 7, 1979, a Notice requesting additional comment. In this Notice, the MTB proposed two alternatives to its earlier proposal, one based upon the exposed population and another for installation of control valves only at pumping stations and terminals.

The Safety Board is pleased that the MTB is now evaluating the need for population-based standards for the control of HVL pipelines. However, it is difficult to understand MTB's alternate proposal which reduces the ability for controlling the amount of product released from a pipeline rupture. This proposal does not reflect HVL pipeline accident history, the findings of the Safety Board's special study, "Effects of Delay in Shutting Down Failed Pipeline Systems and Methods of Providing Rapid Shutdown," the recommendations for control of liquid pipelines in the DOT study, "Rapid Shutdown of Failed Pipeline Systems and Limiting of Pressure to Prevent Pipeline Failure Due to Overpressure," and the requirements of the liquid pipeline industry's standard "ANSI B31.4 Code for Pressure Piping: Liquid Petroleum Piping Systems." Failure to require improvements in the control of HVL pipelines commensurate with increases in the exposed population makes a catastrophic accident more probable.

Nor has MTB proposed performance standards for the prompt detection and rapid isolation of failed portions of HVL pipelines. Leak detection equipment and remotely operable valves at specific intervals are essential hardware for effectively reducing the hazards associated with failures in HVL pipelines; but without standards by which to establish the response characteristics of these safety devices, there is no assurance that the equipment will be adequately responsive to reduce to a minimum the losses resulting from the inadvertent release of highly volatile liquids.

SUMMARY OF PROGRESS AND REMAINING PROBLEMS

As a result of the Safety Board's accident investigation and safety objective activities, MTB has initiated rulemaking actions which will substantially improve the safety of HVL pipeline transportation. The regulations which have been

issued and those which have been proposed will affect all aspects of HVL pipeline operations. Based upon regulatory action taken to date, the Safety Board has classified 14 of the 19 recommendations for improved safety of HVL pipeline systems as "Open-Acceptable Action," and 1 recommendation as "Open-Acceptable Alternate Action." These recommendations will remain open until rulemaking actions are satisfactorily completed. Two of the recommendations were closed upon completion of acceptable action; and the remaining two recommendations are classified as "Open-Awaiting Reply" and will be reevaluated upon receipt of a response from the Department of Transportation.

While recent MTB rulemaking initiatives have been generally responsive to Safety Board recommendations, many of the proposed safety standards have not yet been adopted; therefore actual safety improvements will not be realized until the regulations become effective. MTB's publicly announced schedule for issuing two final rulemaking actions in June 1979, and a third in September 1979, was not met. A final rule was issued on July 6, 1979, but the MTB has no additional actions scheduled through September 1979. The Safety Board reiterates its recommendations that the MTB expedite present rulemaking actions and establish population-based requirements to minimize losses due to inadvertent releases of product from HVL pipelines. In addition, evaluation of current rulemaking actions and past accident data indicates the need for additional safety standards to further minimize risks to the public.

Therefore, the Safety Board has recommended that the Secretary of Transportation:

"Establish minimum performance standards for the prompt detection and rapid isolation of failed sections of highly volatile liquid pipelines. (Class II, Priority Action) (P-79-30)"

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ ELWOOD T. DRIVER
Vice Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ PATRICIA A. GOLDMAN
Member

/s/ G.H. PATRICK BURSLEY
Member

September 28, 1979

APPENDIX I

**SAFETY BOARD RECOMMENDATIONS
TO THE DEPARTMENT OF TRANSPORTATION
FOR IMPROVED HVL PIPELINE SAFETY**

- | <u>No.</u> | <u>Recommendation and Status</u> |
|------------|--|
| 72-8 | Review the proposals made by the Hazardous Materials Regulation Board in Docket No. HM-6A on April 18, 1969. Rulemaking should be undertaken to provide for more complete controls for the transportation by pipeline of liquefied petroleum gas. These regulations should include minimum standards for the design, construction, testing, operation, and maintenance of both new and existing pipelines.
Status: Open—Acceptable Action |
| 72-9 | Initiate an amendment to the Code of Federal Regulations, Title 49, Section 195.218 Welding: Seam offset, to require longitudinal welds to be placed in the upper half of the pipe during construction. Similarly, that in repairs to a pipeline involving pipe replacement, a requirement be issued that the longitudinal welds of replacement pipe be positioned in the upper half.
Status: Open—Acceptable Action |
| 72-10 | Conduct a study, in cooperation with sources of qualified pipeline expertise, concerning minimum valve-spacing standards and the use of remotely operated valves, and check valves on all liquefied petroleum pipelines. As an adjunct to this, the Safety Board invites attention to a recommendation made in its special study of "Effects of Delay in Shutting Down Failed Pipeline Systems and Methods of Providing Rapid Shutdown."
Status: Open—Acceptable Action |
| 72-11 | Undertake a study, in cooperation with sources of qualified pipeline expertise, of the various current practices in the handling, containing, and disposing of liquefied petroleum products resulting from pipeline failures. This study should include such external factors as weather conditions, leak site topography and population density in the vicinity of the leak. Based upon the results of this study, there should be formulated and added as an amendment to 49 CFR 195, minimum regulations regarding the handling of liquefied petroleum gas as a result of pipeline leaks.
Status: Open—Acceptable Action |
| 73-47 | Expedite rulemaking currently under study to provide for more complete and effective controls over the transportation by pipeline of liquefied petroleum gases, which would include natural gas liquids. These regulations should contain minimum standards for the design, construction, testing, operation, and maintenance of both new and existing pipelines.
Status: Open—Acceptable Action |

- | <u>No.</u> | <u>Recommendation and Status</u> |
|------------|--|
| 73-48 | Undertake rulemaking concerning methods of handling, containing, and disposing of liquefied petroleum gases involved in pipeline failure. This rulemaking should take into account such external factors as weather conditions, leak site topography, and population density.
Status: Open—Acceptable Action |
| 73-49 | Amend 49 CFR 195 to establish an educational program to enable customers and the general public to recognize and report liquefied petroleum gas leaks to appropriate officials. These regulations should be similar to those which appear in 49 CFR 192, "Transportation of Natural and Other Gas by Pipeline; Minimum Safety Standards."
Status: Open—Acceptable Action |
| 73-50 | Undertake a study of the effects of pipe stress concentration caused by improper weld positioning and improper welding techniques. Based on the results of this study, incorporate into 49 CFR 195 specifications for pipeline repair-welding procedures designed to avoid stress concentrations.
Status: Open—Acceptable Action |
| 74-50 | In its upcoming rulemaking action for the transportation of highly volatile, toxic, or corrosive liquids, include anhydrous ammonia pipeline systems. Particular emphasis should be placed on a reduction of the maximum allowable pressures for NH ₃ systems, more closely spaced valves, and more remotely or automatically operated valves.
Status: Open—Acceptable Action |
| 74-51 | In its consideration to take regulatory action concerning the methods of handling, containing, and disposing of liquefied petroleum gases, include NH ₃ . Necessary information should be obtained from the OPS study on highly volatile, toxic and/or corrosive liquids currently underway. Rulemaking should take into account such external factors as weather conditions, leak site topography, and population density. Attention should be given to the local temperature inversions caused by the rapid expansion of the escaping NH ₃ and the possible use of externally supplied heat and air blowers to force the NH ₃ vapors to rise and dissipate.
Status: Open—Acceptable Action |
| 74-52 | Amend CFR 49 195.404(b), Maps and Records, to provide for pressure recording instruments to be installed and properly maintained at each pump station and each pipeline terminal and that these recorded pressures be retained at a central location for at least 3 years.
Status: Open—Acceptable Action |
| 74-53 | Amend 49 CFR 195 to require liquid petroleum pipeline operators to establish liaison with appropriate public officials, including fire and police officials, to better inform them of the characteristics and hazards of liquid |

No.

Recommendation and Status

petroleum and related products. These regulations should include anhydrous ammonia and should be similar to those which appear in 49 CFR 192, "Transportation of Natural and Other Gas by Pipeline; Minimum Safety Standards."

Status: Open—Acceptable Action

76-20 Review all pertinent data such as leak and failure reports submitted by liquid pipeline carriers to determine if longitudinal weld failures constitute a recurrent safety problem, and take appropriate regulatory action if they do.
Status: Closed—Acceptable Action

76-21 Request all pipeline companies which have installed ERW pipe manufactured by the Jones and Laughlin Steel Corporation to review their records on longitudinal seam failures and determine if the number of such failures is abnormally high. After DOT reviews these data it should take necessary corrective action.

Status: Open—Acceptable Alternate Action

78-1 Include in proposed 49 CFR 195 regulations, provisions for checking natural gas pipelines that are being converted to liquefied petroleum gas (LPG) service for stress-corrosion cracking.

Status: Closed—Acceptable Action

78-9 Expedite the publishing of the Notice of Proposed Rulemaking on regulations for the safe transportation by pipelines of liquefied petroleum gases (LPG). Include a comprehensive section on the communications required for the safe operation of LPG pipelines.

Status: Open—Awaiting Reply

78-10 Include in proposed regulations a section similar to the emergency plan section of the natural gas code (49 CFR 192.815) that will require operators to provide information to persons who live or work within 220 yards of a propane pipeline, and up to 1 mile if located downhill of a LPG pipeline, about the particular hazards of LPG and how to contact emergency response personnel.

Status: Open—Awaiting Reply

78-63 Expedite completion of the rulemaking to strengthen the Federal regulations concerning LPG pipelines.

Status: Open - Acceptable Action

79-6 Reevaluate all recommendations made by the Safety Board concerning LPG, and expedite those that require rulemaking.

Status: Open - Acceptable Action

APPENDIX II

HISTORY OF THE ADMINISTRATION
OF LIQUID PIPELINE SAFETYLEGISLATIVE BACKGROUND

Although the Interstate Commerce Commission was authorized to regulate the safe transportation of hazardous liquids by pipeline in 1908, no safety regulations were adopted under this authority. In 1960, Congress withdrew the authority to regulate hazardous liquid transportation by pipeline from the ICC. In 1965 in response to an oil pipeline industry request, Congress restored the authority to the ICC so that responsibility would be vested in one Federal agency and thus, prevent the States from implementing individual and possibly conflicting local regulations.

Effective April 1, 1967, Congress transferred jurisdiction for the regulation of the transportation of explosives and other dangerous articles (including the transportation of hazardous liquids by pipeline) to the Federal Railroad Administration of the Department of Transportation. On August 22, 1972, Public Law 92-401 amended the Department of Transportation Act to vest the authority for regulating liquid pipeline safety in the Secretary of Transportation.

REGULATORY BACKGROUND

The ICC first issued a notice on October 5, 1965, that instituted a proceeding for the formulation of regulations for the safe transportation by pipeline of explosives and other dangerous articles. Effectively, this notice was an advance notice of proposed rulemaking seeking comments from the industry and the public about the regulations which should be proposed. More than 25 individual comments were received, of which three made recommendations for major changes. After reviewing comments, the ICC on January 16, 1967, issued a notice of proposed rulemaking setting forth specific proposed requirements to be added to Title 49 of the Code of Federal Regulations to be known as Part 180. In issuing this notice, the ICC stated that it was not possible to develop a complete set of regulations in the time available; therefore, the proposed Part 180 contained only general regulations setting forth the scope, purpose, applicability, and a subpart on the reporting of accidents. The Commission stated that ultimately the regulations would include requirements for design, materials, construction, nondestructive testing, operations and maintenance of new systems, and would also provide requirements for pipelines constructed prior to the effective date of the regulation.

Before the ICC took final action on this notice, regulatory jurisdiction over the transportation of explosives and other dangerous articles was transferred to the Federal Railroad Administration (FRA), Department of Transportation effective April 1, 1967. On June 16, 1967, the FRA issued a final rule adopting Part 180 virtually as proposed by the ICC, with a proposed effective date of September 6, 1967. The effective date was delayed until December 31, 1967.

On July 12, 1968, the FRA issued a notice of proposed rulemaking setting forth design, construction, operation, maintenance, and testing requirements to apply to any carrier transporting hazardous materials by pipeline in interstate or foreign commerce (these rules excepted the carriage of water, and natural or artificial gas). The closing date for consideration of comments was November 12, 1968.

In August 1968, the Office of Pipeline Safety (OPS) was established and the responsibility for technical advice to the FRA on liquid pipelines was transferred from the Office of Hazardous Materials to the OPS.

On September 23, 1969, the FRA issued a notice of final rulemaking for design, operation, construction, and maintenance.

On March 26, 1970, the FRA issued a notice of rulemaking which amended six sections of Part 195 to modify slightly several provisions of the regulations. These revisions were of a minor nature and became effective April 1, 1970.

On November 2, 1970, the FRA issued a notice of final rulemaking for testing of pipelines and setting operating pressure limits. Effective on date issued.

On April 28, 1971, the FRA issued a notice amending 195.306 to allow testing of pipelines with the product transported. Effective on date issued.

On September 7, 1972, the FRA issued a notice extending the time period for testing relief valves on pressurized storage tanks used to store liquefied gases. The amendment was effective on October 15, 1972.

On January 24, 1973, the OPS issued a notice advising that Public Law 92-401 had been amended to transfer the responsibility for liquid pipeline safety from the Federal Railroad Administrator and vest it in the Secretary of Transportation. It further related that the Secretary had delegated his authority with respect to liquid pipeline safety to the Assistant Secretary for Safety and Consumer Affairs on November 7, 1972, and that on November 7, 1972, the Assistant Secretary had delegated his authority to the Director of the Office of Pipeline Safety.

On March 13, 1973, the OPS issued requirements for telephonic notification of accidents. Effective April 19, 1973.

On May 28, 1974, the OPS issued requirements which prohibited movement of pipelines containing liquefied gases except under specific conditions. Effective July 15, 1974.

On February 27, 1975, OPS issued amendments to the requirements for welding. The purpose of the amendments was to improve the quality of welding. Effective March 20, 1975.

On June 23, 1975, the OPS issued amendments to the welding requirements as a result of a petition from Alyeska Pipeline Company. Effective July 1, 1975.

On July 7, 1975, the delegation of liquid pipeline safety authority was transferred to the Director, Materials Transportation Bureau. The OPS became a part of the MTB and was redesignated the Office of Pipeline Safety Operations (OPSO).

On March 25, 1976, the MTB issued amendments to update reference standards in Part 195. Effective July 1, 1976.

On June 17, 1976, the MTB issued amendments to paragraphs 195.212 and 195.216 to modify the pipe bending requirements. Effective July 31, 1976.

On April 4, 1977, the OPSO issued proposed requirements for converting existing gas pipelines to liquid service.

On September 23, 1977, the delegation of liquid pipeline safety authority was transferred to the Director, Research and Special Programs Administration and then redelegated to the Director, Materials Transportation Bureau. This authority was redelegated within the Bureau to the Office of Pipeline Safety Regulation (OPSR).

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