(49 U.S.C. 1803, 1804, 1808, 49 CFR 1.53 App. A to Part 1, and paragraph (a)(4) of App. A to Part 106)

Note.—The Materials Transportation Bureau has determined that this document will not result in a major economic impact under the terms of Executive Order 12221 and DOT implementing procedures (44 FR 11034) nor require an environmental impact statement under the National Environmental Policy Act (49 U.S.C. 4321 et seq.). A regulatory evaluation and environmental assessment are available for review in the docket.

Issued in Washington, D.C., on December 19, 1980.

Alan I. Roberts,

Associate Director for Hazardous Materials Regulation, Materials Transportation Bureau.

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49 CFR Part 195

[Notice 4; Docket PS-53]

Transportation of Liquids by Pipeline; Valve Spacing on Pipelines Carrying Highly Volatile Liquids

AGENCY: Materials Transportation Bureau.

ACTION: Withdrawal of proposals to require remotely controlled valves on pipelines transporting highly volatile liquids (HVL).

SUMMARY: In an effort to reduce the effects of HVL pipeline accidents, a notice of proposed rulemaking (43 FR 39402) was published on September 5, 1978, proposing a requirement to install remotely controlled, closely spaced valves on new pipelines and certain existing pipelines. An amended notice of proposed rulemaking (44 FR 53187) was published on September 13, 1979, proposing two alternative schemes to locate valves on HVL pipelines. A public hearing was held on this matter on December 12, 1979.

Based on the information gained through these proceedings and its own analysis and evaluation of that information, the MTB has concluded that remotely controlled, closely spaced valves are not an effective means to reduce the effects of HVL pipeline ruptures. Therefore, the proposals to install valves on HVL pipelines are being withdrawn.

FOR FURTHER INFORMATION CONTACT: Frank Robinson, 202-426-2392.

SUPPLEMENTARY INFORMATION:

Development of Notice 1

Notice 1, Docket No. PS-53, "Valve Spacing on Pipelines Carrying Highly Volatile Liquids", was published on September 5, 1978, proposing requirements to install closely spaced, remotely controlled valves on HVL pipelines. This proposal was prompted by statistics which illustrate HVL spills to be more hazardous than spills of other liquids. The record of pipeline accidents report to the MTB on Form 7000-1 for the 12-year period from 1968 through 1979 shows that although HVL pipeline accidents comprise only 12 percent (421) of the 3,603 reported accidents involving liquid pipelines, the HVL accidents caused 69 percent of the deaths (47 of 68) and 52 percent of the injuries (88 of 168)—an average of four deaths and seven injuries per year.

The notion of installing closely spaced, remotely controlled valves to decrease the amount of HVL spilled and thereby reduce the accident effects was supported by the following:

(1) A National Transportation Safety Board (NTSB) study (PSS-71-1) which states on page 19: "A large proportion of the losses in the accidents was due to the inability or failure to shut down rapidly not to the original failure * * * By reducing the time to shut down a failed pipeline system to minimize the loss of material, the hazardous effects to the public, to persons working near the pipeline and to property can be minimized or eliminated * * *"

(2) A Department of Transportation study performed by Mechanics Research, Inc. (DOT-AS-30008) which states in paragraph 5.3.1.3 " * * * it is obvious that the use of remotely controlled valves could drastically reduce the amount of product loss compared to the use of manual valves." And in paragraph 5.2.3.1.2: "Strong correlations were found to exist between accident effects (the number of fatalities, the number of injuries, and the amount of property damage) and the amount of product discharge."

(3) A Department of Transportation study prepared by the Columbus Laboratories (DOT/OPSO-75/06) which states on page 93: "The time to isolate a pump station and/or shut down the pipeline system varies with the degree of automatic controls * * * The fact that a majority of block valves must be manually closed indicates a very long time lag in closing off a section of damaged pipeline * * * One remedy would be to install remote control operators on the block valves. This is only a partial solution however, since the spacing of the valves is also a factor."

(4) The American National Standards Institute (ANSI) B31.4 Code "Liquid Petroleum Transportation Piping Systems" which requires remotely controlled valves at 7.5 mile maximum spacing in industrial, commercial, or residential areas on HVL pipelines.

Response to Notice 1

Sixteen commenters responded to Notice 1. There was a great disparity of conflicting views in the response to the notice. Some commenters totally

rejected the idea of installing valves. Others recommended installing valves only at pump stations and terminals. Still others recommended adopting the valve spacing requirements of Part 192 for gas transmission pipelines or some variation thereof. Few of the recommendations were well supported with information demonstrating how the recommendation would be effective.

Development of Notice 3

In view of the disparity of views and the general lack of supporting information, an amended notice of proposed rulemaking (Notice 3) was published on September 13, 1979, seeking further information and proposing two alternative schemes for valve spacing. The first alternative would have applied a class location concept and valve spacing requirements similar to the requirements of Part 192 for new HVL pipelines and for HVL pipelines which are relocated, replaced, or otherwise changed. The second alternative would have required installation of remotely controlled valves from attended locations on both new and existing HVL pipelines to permit isolation of pipeline segments from pump station to pump station and from pump station to terminal. The amended notice of proposed rulemaking also gave notice of a public hearing to give interested persons ample opportunity to furnish further supporting information.

Results of Public Hearing

A public hearing was held on December 12, 1979. Spokesmen for the NTSB, the American Petroleum Institute (API), and the ANSI B31.4 subcommittee presented arguments for and against the effectiveness and adoption of the amended proposed rule as follows:

The NTSB recommended that valve spacing based on population density (first alternative) be adopted arguing that only this scheme is consistent with the findings of the NTSB study and the MRI sudy as well as the requirements of the B31.4 Code, all of which are cited above as support for the original position that remotely controlled valves could be an effective means to limit the effects of an HVL pipeline rupture.

The API argued that other paragraphs in the cited studies cast doubt on the cost-effectiveness of any scheme involving closely spaced valves and quoted portions of these studies supporting this view. The API argued that since compliance with the B31.4 Code is optional, the designer is free to comply with portions of the B31.4 Code where compliance is cost-effective, and contrasted this type of cost-effective application of a portion of the code to a rigid requirement of Part 195 to install closely spaced valves in all pipelines regardless of whether the requirement is cost-effective. The API cited a study submitted by API in response to Notice 1 which concluded that installing remotely controlled valves every 7.5 miles on existing HVL pipelines would cost $160 million with the costs outweighing the benefits by a ratio of forty to one and argued that the same ratio of costs to benefits would hold for new HVL pipelines as well. However, the API did continue to support the second alternative which would require remotely controlled valves at pump stations and terminals as it had supported in response to Notice 1. The API stated that an engineering study concerning the effectiveness of the two alternatives given in Notice 3 together with the respective costs and benefits would be submitted as formal comments when these studies were completed.

The ANSI B31.4 subcommittee representative presented engineering computations which demonstrated that an ordinary HVL leak would create a hazardous area extending 400–500 feet from the leak site (depending on wind and terrain) usually within 20 minutes from the time of rupture and the hazardous area would tend to stabilize at this distance so long as the spill continued at a constant rate. The B31.4 representative argued that the leak cannot be detected, pumps shut down, and valves closed quickly enough to preclude the formulation of a hazardous vapor cloud or reduce the size of the hazardous area; hence, valves will not substantially affect the resulting risk of explosion. Although closely spaced valves will not prevent or reduce the magnitude of the hazard, closing such valves can reduce the time the hazard is present, according to a B31.4 committee spokesman. The reason the B31.4 Code requires closely spaced valves in industrial, commercial, and residential areas is to reduce the duration of the hazard and facilitate pipeline repair, according to the spokesman.

Response to Notice 3

Twelve commenters submitted comments to the docket in response to Notice 3. Among these were the NTSB, API, and ANSI B31.4 subcommittee all of whom commented at the public hearing.

One industry commenter, the NTSB, and the Iowa State Commerce Commission argued that valves are an effective means to limit the hazard created by an HVL spill. However, none of these commenters gave computations or demonstrated why valves would be effective.

Six industry commenters, the API, and the ANSI B31.4 committee argued that valves are not an effective means to limit the hazard created by an HVL spill. The ANSI B31.4 subcommittee presented an engineering study which demonstrated that (1) a hazardous vapor cloud will form shortly after a spill occurs, and (2) this hazardous vapor cloud will not continue to increase in size, but will soon stabilize at its maximum size. The study goes on to demonstrate that valve spacing will not affect the size of the hazardous vapor cloud and, hence, will not affect the potential accident effects, but will only affect the time the hazard exists. Since a vapor cloud is usually ignited shortly after pipeline rupture, the study shows that valve spacing has little if any effect on the risk presented by an HVL pipeline rupture and release.

The API submitted an engineering study concerning the effectiveness of valve spacing and an economic study concerning the costs and benefits of the two alternatives given in Notice 3.

The engineering study included an analytical model for predicting the flow rate from a ruptured HVL pipeline and the associated downwind flammable boundaries together with the results of its application to 32 separate pipeline rupture situations. The variables considered were the distance between pipeline isolation valves, pump shutdown time, isolation valve closure time, pumping rates, and rupture configuration. The study showed that the closely spaced and remotely controlled valves cannot reduce the severity of a hazard because the addition of such valves will not decrease the downwind flammable boundary of the vapor cloud. Although closely spaced valves will cause the vapor cloud to recede faster from its maximum size, the time saved is small in the absolute sense and small compared to the rate of growth and rate of recession of the vapor cloud if the valves were not present. Consequently, closely spaced valves have no significant effect on the number of fatalities, or injuries, or the amount of property damage that might be caused by an HVL spill according to this study.

The economic study submitted by the API estimated the costs and benefits of alternative No. 1 (install valves according to a class location concept and spacing requirements similar to Part 192) and alternative No. 2 (install valves at pump stations and terminals). Cost estimates were constructed by aggregating individual carrier estimates in response to a questionnaire

distributed by the API. The benefits were estimated by an examination of the record of past accidents to determine the effect of each alternative if the regulation had been in effect at the time of the accident. The first alternative was estimated to cost $23 million annually and would produce benefits valued at $2.2 million annually resulting in a cost benefit ratio of 10:1. The second alternative was estimated to cost $2.3 million annually with an annual benefit of $0.8 million resulting in a cost benefit ratio of 3:1.

Contrary to its recommendation to install valves at pump stations and terminals in the response to Notice 1 and at the public hearing, the API, in response to Notice 3, recommended that no additional valves be installed on HVL pipelines on the basis of the results of the engineering and economic studies.

Analysis

The studies (PSS-71-1, DOT-AS-30008, DOT/OPSO-75/06) cited in Notice 1 imply that closely spaced valves on HVL pipelines can significantly reduce the effects of an HVL accident and that the capability to remotely control these valves for faster closure will reduce the accident effects even further. Additionally, the B31.4 Code requires HVL pipelines in certain populated areas to have remotely operable valves every 7.5 miles, presumably for the purpose of reducing the potential damage of an HVL spill. However, the inference drawn from the cited studies and the B31.4 Code that remotely controlled valves are an effective means to reduce the accident effects of an HVL spill is contradicted by the results of two different engineering studies prepared by the B31.4 subcommittee and the API.

The studies cited in Notice 1 were of a general nature and offered nothing in the way of specific analysis or other demonstrative evidence in support of the statements alluding to the effectiveness of remotely controlled closely spaced valves.

The B31.4 subcommittee study and the API study, on the one hand, were specifically designed to examine in detail and determine the effectiveness of valve spacing and to derive the results from computations. The engineering computations and studies presented by the B31.4 subcommittee and the API demonstrating the ineffectiveness of closely spaced valves are based on sound engineering principles and reasonable assumptions. For example, the B31.4 study bases the amount of HVL spilled on very basic and well known formulae. Further, the assumptions made in the B31.4 study, such as a 4 mph wind and the time to recognize that a leak has occurred and pumps have shut down (30 minutes) are reasonable. Similarly, in the API study, the use of a mathematical model is an often used technique to solve this problem, and, again, the assumptions made are reasonable. As a consequence, the B31.4 subcommittee study and the API study present a much more convincing argument than the other studies.

The cost/benefit study presented by the API estimates the costs and benefits of each proposal on existing pipelines. The API reviewed 269 accidents which occurred during the period 1970-1979, and eliminated from further consideration those accidents on which valves would not have made a difference in the outcome (i.e., accidents which occurred within a pump station, accidents in which the commodity was ignited before the accident was detected, accidents in which the segment of pipeline was in compliance with one or more of the proposals, etc.). Additionally, although the engineering study demonstrated that valves are not an effective means to reduce the accident effects, the API assumed that on the remaining accidents all of the deaths, injuries, and property damage would have been prevented. Estimating the benefits on this basis will give benefits as great as can reasonably be expected. Further, judging by the magnitude of the cost/benefit ratios (10:1 and 3:1), it is unlikely that making minor changes in the methodology or the assumptions would alter the end result to the point that a changed course of regulatory action would be indicated.

The MTB learned after the hearing that the B31.4 subcommittee plans to review the requirement in the B31.4 Code to install remotely controlled valves at certain locations on HVL pipelines as a result of the information developed during the hearing. It is interesting to note that an industry code might be changed in view of information developed pursuant to a regulatory proposal. Further, it is encouraging to see at work this confluence of technical and regulatory ideas between government and industry developing better pipeline safety regulations as well as industry codes.

Conclusions

The engineering studies prepared by the B31.4 subcommittee and the API demonstrate the importance of rapid leak detection and pump shutdown in reducing the hazard created by an HVL spill. A recent final rule concerning procedures for operations, maintenance, and emergencies (Docket PS-51; 44 FR 41197, July 16, 1979, and 44 FR 70164, December 6, 1979) recognized the importance of rapid leak detection and pump shutdown by requiring that pipeline operations data be monitored at attended locations and that established procedures be followed.

Heretofore, there was no study to determine the effectiveness of closely spaced valves to reduce the accident effects of an HVL spill. The studies prepared by the B31.4 subcommittee and the API clearly demonstrate that valves are not an effective means to reduce the accident effects and that a highly unfavorable cost/benefit result could be expected.

Because valves are not an effective means to reduce the accident effects of an HVL spill, the proposal to install valves along the pipeline and the proposal to install valves at pump stations and terminals as contained in Docket PS-53 are hereby withdrawn.

(Hazardous Liquid Pipeline Safety Act of 1979 (Title II of Pub. L. 96-129, November 30, 1979); 49 CFR 1.53 and Appendix A of Part 1)

Issued in Washington, D.C., on December 31, 1980.

I. D. Santman,

Director, Materials Transportation Bureau.

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National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. 81-02; Notice 1]

Federal Motor Vehicle Safety Standards; Lamps, Reflective Devices, and Associated Equipment

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice proposes that Safety Standard No. 108 be amended to require installation of a single center, high-mounted stoplamp on passenger cars, in addition to the stoplamps presently required. The primary purpose of the amendment would be to reduce rear end collisions by providing a more effective indication to following drivers that the brake pedal in the car ahead has been depressed. The proposal is supported by test data generated under NHTSA contracts that indicate a system of this nature has the potential of significantly improving motor vehicle safety.

DATES: Comment closing date: April 10, 1981. Proposed Effective date: September 1, 1983.