

Log P 298E



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: October 1, 1990

In reply refer to: P-90-37 and -38

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On October 3, 1989, the United States fishing vessel NORTHUMBERLAND struck and ruptured a 16-inch-diameter natural gas transmission pipeline about 1/2 nautical mile offshore in the Gulf of Mexico, and about 5 1/3 nautical miles west of the jetties at the entrance to Sabine Pass, Texas. Natural gas under a pressure of 835 psig was released. An undetermined source on board the vessel ignited the gas, and within seconds, the entire vessel was engulfed in flames. The fire on the vessel burned itself out on October 4. Leaking gas from the pipeline also continued to burn until October 4. Of the 14 crewmembers, 11 died as a result of the accident.¹

When the accident occurred, the NORTHUMBERLAND was in shallow waters and close to shore, which was normal and usual for its trade. The major constraint to the vessel's operation in the area was its draft. The water depth and the estimated draft of the vessel at the time of the accident were both about 10 feet. Consequently, the bottom of the vessel was close to the sea bottom or slightly penetrating the bottom when it struck the pipeline.

The pipeline was not fully buried when it was struck by the NORTHUMBERLAND. Diving surveys conducted after the accident established that the unburied segments of the pipeline were not confined to a limited length, but extended for as much as 400 feet in the immediate accident area. The quantity and type of marine growth found on the pipeline indicated that the pipeline had been unburied for a prolonged period. Damage to the concrete coating also indicated that the pipeline had been previously struck by other vessels or equipment towed by vessels.

¹ Additional information is given in the accident report. (National Transportation Safety Board, 1990. Fire on board the F/V NORTHUMBERLAND and rupture of a natural gas transmission pipeline in the Gulf of Mexico near Sabine Pass, Texas, October 3, 1989. Pipeline Accident Report NTSB/PAR-90/02. Washington, DC.)

The U.S. Army Corps of Engineers (the Corps) issues permits to operators placing man-made objects in navigable waters to prevent the obstruction of such waterways. Therefore, in issuing its permit to the owner and operator of the pipeline, the Corps required the pipeline to be buried and maintained to the buried depths shown on approved plans (about 9 feet below the seabed in the case of this pipeline). The NORTHUMBERLAND struck and ruptured the pipeline because the pipeline was not buried and maintained at the burial depth required by the Corps' permit.

An offshore pipeline can be and often is subject to the jurisdiction of several Federal and State regulatory agencies. To illustrate, the pipeline involved in this accident was subject to the jurisdiction of the Research and Special Programs Administration's (RSPA) Office of Pipeline Safety (OPS) within the U.S. Department of Transportation (DOT), the Minerals Management Service (MMS) within the Department of the Interior (DOI), the Corps, and the General Land Office of Texas. The investigation of the NORTHUMBERLAND accident revealed many deficiencies in the Federal regulations for submerged pipelines.

The regulations or standards of the OPS, the MMS, and the Corps differ in their applicability and scope. Pipelines are exempted from regulation by one agency but not another because of seemingly arbitrary factors such as minimum stress level, diameter, or location of a pipeline. For example, the OPS does not regulate hazardous liquid pipelines that operate at a stress level of 20 percent or less, while the MMS and the Corps do not have a similar exclusion. The MMS requires the burial of pipelines greater than 8 5/8 inches in diameter, whereas the OPS requires the burial of hazardous liquid and natural gas transmission pipelines without consideration of diameter.

Further, DOT regulations, enforced by OPS, also have grandfathering provisions that exempt existing pipelines from many standards. As a result of the inconsistent standards, exemptions, and grandfathering provisions among the different regulatory agencies, submerged pipelines may not be required to be buried, protected, or even regulated. To ensure that all pipelines with comparable hazards will be consistently protected, RSPA (through OPS), the MMS, and the Corps collectively need to evaluate the applicability of their respective regulations and to amend their regulations as necessary to provide uniform regulation of submerged pipelines.

The OPS, the MMS, and the Corps have acknowledged the need to bury submerged pipelines to protect them from vessel operations. Yet, the MMS and the Corps were unable to cite the basis of their respective standards, whereas an OPS representative indicated that OPS standards were based on industry practices.

The Safety Board believes that the appropriate burial depth to protect a submerged pipeline from damage depends on several factors, including the design of the pipeline, the product transported, the operating pressures of the pipeline, characteristics of the sea bottom, subsidence and sedimentation rates, the depth of water, and the type and extent of vessel activity in the area. Without proper consideration of these factors, burial

depths become arbitrary and may not necessarily be effective in protecting the pipelines from damage. Because the OPS, the MMS, and the Corps cannot justify the basis for their standards, the Safety Board is concerned that each agency has adopted its standards without proper consideration of these factors.

Also, the burial standards of the OPS, the MMS, and the Corps establish the "natural bottom" or the "sea bottom" as the reference datum for burial depths. However, in areas of soft mud and silt, such as those found in much of the Gulf of Mexico, there may be several feet of mud and silt suspended in the water. Because the suspension of mud and silt does not provide effective support or cover for a pipeline, the reference datum must be located where the bottom sediment has sufficient consistency and compaction to support and cover a pipeline. The Safety Board believes that prescribed burial depths would provide a more consistent level of protection if the reference datum was based on a specified compaction of the bottom sediments.

Both the OPS and the MMS have designated the requirements to bury and protect submerged pipelines as construction or installation standards that do not apply throughout the service life of the pipeline. The need to protect a pipeline from damage, however, does not diminish after the pipeline has been constructed. Consequently, the level of protection required throughout the service life of a pipeline should not be less than that required at the time of construction.

Because of these deficiencies, DOT and DOI regulations and the standards of the Corps do not provide a sufficient level of safety. Consequently, the RSPA (through the OPS), the MMS, and the Corps should, collectively and under the leadership of the RSPA, develop and implement new standards for the burial and continued protection of submerged pipelines based on the potential risks to and from the pipeline.

Requirements to bury and protect submerged pipelines from surface vessels will have little effect without proper inspection and surveillance programs. Over time, environmental effects and the activities of surface vessels in the near-shore or along embankment areas can lead to the loss of overburden over a submerged pipeline that is offshore or under a river. The pipeline therefore becomes more vulnerable to external damage and poses a greater danger to vessels that operate in the area.

Because the OPS, the MMS, and the Corps do not explicitly require operators to conduct regular inspections of submerged pipelines, operators have not given adequate attention to potential dangers from unburied pipelines. Information revealed during the investigation suggests that some operators have adopted a reactive posture from which they take action after an accident occurs rather than a proactive posture from which they would continuously search for and identify hazardous conditions.

Because of concerns about deficiencies in the regulations and practices to protect and inspect submerged pipelines, the Safety Board, on February 22, 1990, issued Safety Recommendations P-90-5 to the DOT and P-90-2 to the DOI recommending that the Departments determine effective methods of

inspection, maintenance, and protection for offshore pipelines in shallow waters of the Gulf of Mexico. The DOT responded that a Federal task force, under the sponsorship of OPS, had been established in February 1990 to develop solutions to the hazards that may exist between offshore pipelines and fishing vessels in the Gulf of Mexico. Other participating agencies included the MMS, the U.S. Coast Guard, the Corps, the National Oceanic and Atmospheric Administration, and the States of Texas and Louisiana. The OPS has indicated that by October 1, 1990, the task force will have completed a report on the long-term regulatory and administrative projects to be initiated by each agency. The DOI responded that it is cooperating with the DOT through the Federal task force.

Since these two recommendations were issued, however, the Safety Board has become concerned that the safety problems with submerged pipelines are not confined to the offshore areas of the Gulf of Mexico. A submerged pipeline under a river, shipping channel, or other body of water is also susceptible to being unburied and damaged or ruptured by a vessel. For example, on January 2, 1990, a submerged 12-inch pipeline transporting heating oil was ruptured in the Arthur Kill channel between Staten Island, New York, and Linden, New Jersey. Evidence indicates that the pipeline was struck possibly by a passing ship or dredge.

Although the Federal task force is addressing safety issues involving commercial fishing vessels and offshore pipelines in the Gulf of Mexico, the Safety Board now believes that the scope of the initial recommendations needs to be expanded to evaluate the level of safety that exists for all submerged pipelines located under navigable waterways. The evaluation should address the issues and problems concerning the practices of the both the fishing and pipeline industries, the jurisdiction over submerged pipelines, the deficiencies in regulatory standards for submerged pipelines, the inadequacy of enforcement and oversight, and the need for improved communication and coordination. Because the RSPA, through the OPS, is the primary Federal agency for pipeline safety, the Safety Board believes that RSPA, with the assistance of the MMS, the Coast Guard, and the Corps, should build on the work of the current Federal task force and develop and implement effective methods and requirements to bury, protect, inspect the burial depth of, and maintain all submerged pipelines in areas subject to damage by surface vessels and their operations. The Safety Board has therefore classified Safety Recommendations P-90-5 and -2 as "Closed--Superseded."

While the standards are being developed for the protection of submerged pipelines, measures are also needed to increase communication and coordination between and among government and industry groups. The Safety Board therefore believes that the Corps, the MMS, and the Coast Guard should assist the RSPA with implementation of permanent measures to increase the coordination and communication between and among Federal and State regulatory agencies, and the pipeline, fishing, and marine industries.

Therefore, as a result of this accident, the National Transportation Safety Board recommends that the U.S. Army Corps of Engineers:

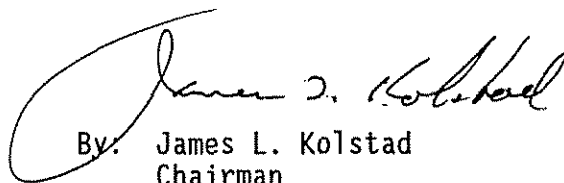
Assist the Research and Special Programs Administration with the development and implementation of effective methods and requirements to bury, protect, inspect the burial depth of, and maintain all submerged pipelines in areas subject to damage by surface vessels and their operations. (Class II, Priority Action) (P-90-37)

Assist the Research and Special Programs Administration with the implementation of permanent measures to increase the coordination and communication between and among Federal and State regulatory agencies, and the pipeline, fishing, and marine industries. (Class II, Priority Action) (P-90-38)

Also as a result of its investigation, the Safety Board issued recommendations to the Zapata Haynie Corporation, Natural Gas Pipeline Company of America, U.S. Department of Transportation, Research and Special Programs Administration, U.S. Coast Guard, U.S. Department of the Interior, Minerals Management Service, National Oceanic and Atmospheric Administration, Interstate Natural Gas Association of America, the American Gas Association, American Public Gas Association, American Petroleum Institute, National Fish Meal and Oil Association, Louisiana Shrimp Association, and National Council of Fishing Vessel Safety and Insurance.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations P-90-37 and -38 in your reply.

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, LAUBER, BURNETT, and HART, Members, concurred in these recommendations.


By: James L. Kolstad
Chairman