



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 1, 1990

In reply refer to: P-90-26 and -27

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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

According to the results of the mechanical and chemical tests conducted on samples of the recovered pipe, the pipeline met the American Petroleum Institute specifications for strength and chemical composition. The absence of any significant corrosion of the pipeline indicates that the pipeline was not in a weakened condition at the time of the accident.

When the accident occurred, the NORTHUMBERLAND was in shallow waters and close to shore, which was normal and usual for its trade. 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.

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 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.

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 Natural Gas Pipeline Company of America (NGPL), operator of the ruptured High Island (HI) lateral pipeline, the Corps required the pipeline to be buried and maintained to the burial depths shown on approved plans (about 9 feet below the seabed in the case of this pipeline). To satisfy the requirement that the pipelines be maintained in accordance with the permit, the Corps expects the operators to conduct periodic inspections. The NORTHUMBERLAND struck and ruptured the pipeline because the pipeline was not buried and maintained at the burial depth required by the Corps' permit.

When it was constructed in 1973, the HI lateral pipeline was placed in the bottom of a trench. The cover, as indicated on the as-built construction plans, was the vertical distance from the level of the sea bottom down to the top of the pipeline; the cover, however, was not necessarily the same as the actual depth of the overburden (the sediment) that may have been over the pipeline.

The investigation revealed that the NGPL never inspected the pipeline after its construction to confirm that natural sedimentation had filled in the trench and had returned the sea bottom to its natural elevation; thus, it is not certain that the trench filled in and produced an overburden of the depth shown on the as-built construction plans and required by the right-of-way permit issued by the Corps. Because the pipeline was supposed to have been buried at the time of construction but was unburied at the time of the accident, the Safety Board is concerned that NGPL's other submerged pipelines may also be unburied and vulnerable to damage and rupture.

The NGPL acknowledged that it did not have a program of regular inspections of its offshore pipelines to determine if they were unburied or vulnerable to damage from surface vessels. Instead, the company adopted a reactive policy of waiting until the company was made aware of a hazardous condition before taking any remedial action, rather than an active policy of looking for hazardous conditions and correcting them before an accident occurred.

Federal regulations (49 CFR 192.613), require that each operator of a gas pipeline must have a procedure for continuing surveillance to determine unusual operating and maintenance conditions. To have an effective procedure that will actually determine such conditions, an operator must regularly and actively inspect for these unusual conditions. According to the Office of Pipeline Safety (OPS), of the Research and Special Programs Administration, NGPL's reliance on aerial overflights was consistent with the requirements of 49 CFR 192.705 for patrolling offshore pipelines. Although aerial overflights or surface patrols are useful to detect leaks, they do not, in the Safety Board's view, satisfy the needs for continuing

surveillance required under section 192.613--to detect that a pipeline has become unburied and vulnerable to damage from surface vessels. Also, because the NGPL did not inspect the pipeline, the NGPL did not maintain the pipeline as required by the permit issued by the Corps. The HI lateral pipeline was exposed and vulnerable to damage from surface vessels because the NGPL did not have a program for continuing surveillance that incorporated regular inspections of the pipeline.

The presence of a submerged pipeline, whether it is offshore or passes under a river or other body of water, is not obvious to a vessel operator. Navigation charts do not mark the location of all submerged pipelines, and charts that do mark some pipelines do not indicate whether or not the pipelines have become unburied. Further, fathometers on vessels cannot detect the presence of a pipeline. Because submerged pipelines transport natural gas and hazardous liquids that can endanger life and property if released, pipeline operators have the primary responsibility to construct, maintain, and operate their pipelines in a manner that does not endanger the public. Therefore, the Safety Board urges the NGPL to establish and implement a program to conduct regular and adequate inspections of its submerged pipelines and to maintain the pipelines in accordance with as-built construction plans and all right-of-way permits.

When NGPL's Gas Control was first notified about the accident at 6:45 p.m. by the Port Arthur, Texas, Fire Department, the duty controllers at Gas Control directed the fire department to contact the NGPL superintendent. A more appropriate procedure would have called for the duty officer to contact the district superintendent. Notification procedures in the emergency plan, however, were based on the presumption that initial notification of an accident would be received by a field [district] employee rather than a controller at Gas Control. Because the emergency plan failed to address this second possibility, the controllers did not have adequate guidance that would have prompted them to contact the superintendent.

After the superintendent was notified of the accident at home about 6:50 p.m., he properly called Gas Control to verify the pressure and flow rates at Compressor Station (CS) 344, the monitoring point closest to the reported accident site. Once Gas Control had verified that the pressure and flow rates for CS 344 were abnormal, the district superintendent had sufficient reason to believe that the HI lateral pipeline was leaking or had ruptured. After arriving at CS 344, the district superintendent had additional information from the metering charts to indicate that the HI lateral pipeline was definitely involved in the accident. In his initial telephone call to the U.S. Coast Guard Station at Sabine, Texas, the unit having search and rescue responsibilities for the area, the superintendent reported that there had been a sudden loss of flow and pressure in the pipeline; his report, however, failed to convey that the pipeline belonged to the NGPL and the superintendent's belief that the pipeline had ruptured. The superintendent obviously believed at that time that it was NGPL's pipeline that was involved because he made such a report to Gas Control shortly after

calling Station Sabine. Had the superintendent made the same report to Station Sabine as he did to Gas Control, subsequent confusion and uncertainty of Coast Guard Station Sabine and the Coast Guard Marine Safety Office (MSO), in Port Arthur, Texas, about ownership of the pipeline could have been avoided.

Further, the superintendent failed to keep the Coast Guard informed about the status of the pipeline or about the actions taken by the NGPL to isolate the pipeline and to stop the flow of natural gas into the pipeline from four offshore platforms owned and operated by four separate producers. The superintendent also failed to maintain lines of communication with the employees sent to the offshore platforms to confirm shutdown; because he left his post to go to an unmanned offshore platform and was no longer in communication with his employees, he was not in a position to effectively serve as an emergency coordinator.

The Safety Board believes that the proper role of an emergency coordinator is to direct the actions of his employees and to be available at all times to the onscene commander or the public official directing the emergency response efforts. However, for an employee to fulfill these responsibilities, the employee must be given sufficient guidance to understand the duties and responsibilities of the emergency coordinator. Because of the superintendent's tenure in that position and his responsibility to review and modify the emergency plan as needed, he was familiar with the plan and understood the guidance it provided. NGPL's emergency plan, however, did not provide sufficient guidance to the district superintendent about emergencies involving the rupture of an offshore transmission pipeline. For example, procedures regarding the communication with emergency responders, actions to be taken for various emergency situations, and the supervision and use of company employees must be explicitly addressed in a company's emergency plan. The Safety Board, therefore, concludes that the failure of the district superintendent to properly fulfill his duties as an emergency coordinator can be attributed to the lack of guidance in the company's emergency plan.

According to Department of Transportation (DOT) regulations in 49 CFR Parts 192 and 195, the pipeline operator is responsible for emergency planning and coordination with local emergency response officials. Under 49 CFR 192.615(c), an operator of a natural gas pipeline must establish liaison with police, fire, and other public officials to (1) learn the responsibilities of each government agency that may respond to a pipeline emergency, (2) acquaint the officials with the operator's ability in responding to an emergency, (3) identify the types of emergencies in which an operator notifies these officials, and (4) plan how the operator and officials can engage in mutual assistance to minimize hazards to life and property.

Although NGPL's emergency plan listed a telephone number for the Coast Guard, the NGPL had taken no action before the accident to establish liaison with local Coast Guard officials as required by the regulations. Consequently, the district superintendent and a corporate representative were both unaware of the respective missions and responsibilities of Coast Guard

Station Sabine and the MSO. During the investigation, an NGPL official stated that the company had expected that the Coast Guard would direct NGPL to the appropriate officials in an emergency. This expectation does not, in the Safety Board's view, satisfy the obligation of an operator to establish and maintain liaison with the Coast Guard representatives, as public officials, and to be knowledgeable of the role of the Coast Guard in an offshore emergency.

The NGPL had to rely on the proper operation of the automatic shutdown systems on the four offshore platforms to isolate the pipeline from offshore; therefore, it was imperative for the district superintendent to be able to contact each producer for confirmation that each platform had shut-in. While the Safety Board is concerned that the district emergency plan did not include a telephone number for the owner of the HI 86 platform, the Board is equally concerned that there was no indication that the superintendent attempted to find an emergency telephone number or otherwise attempted to contact the owner of HI 86. Because of the inability to contact the owner of HI 86 and communications problems with the HI 71A platform, the superintendent correctly dispatched two employees by helicopter to confirm that all four platforms had shut-in.

The failure of the district superintendent to have an emergency telephone number for the owner of the HI 86 platform can be attributed to an absence of emergency planning and coordination between the pipeline operators and the offshore producers. Because the operations of an offshore pipeline and platform are directly integrated, an emergency condition on one will necessarily affect the operation of the other. As shown in this accident, to isolate the pipeline from offshore, the NGPL had to rely on the operation of emergency shutdown systems on platforms that were under the control of the producers. The failure to have a telephone contact for the owner of the HI 86 platform and the communications problems with the HI 71A platform may have been mitigated if NGPL and the producers had previously planned and coordinated for emergency situations. Effective coordination requires that the pipeline operator and the producer have current emergency contacts and agreement on their respective procedures in the event of an offshore emergency.

Although the NGPL has improved its emergency plan for offshore emergencies since the accident, the plan still does not provide adequate guidance about (1) notification procedures for controllers at Gas Control, (2) the duties and responsibilities of the emergency coordinator, and (3) liaison and coordination with public officials and the offshore producers. Consequently, the Safety Board believes that the emergency plan should be further revised to provide explicit guidance in these areas, and that when the revisions have been made, the appropriate employees should be trained and educated about their responsibilities.

Therefore, as a result of this accident, the National Transportation Safety Board recommends that the Natural Gas Pipeline Company of America:

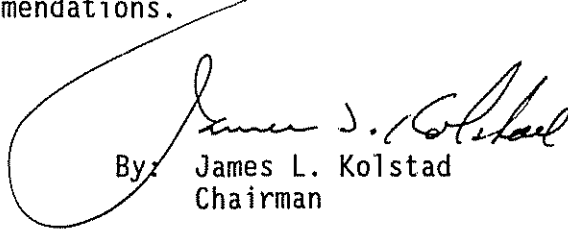
Establish and implement a program to conduct regular and adequate inspections of the company's submerged pipelines and to maintain them in accordance with as-built construction plans and all right-of-way permits. (Class II, Priority Action) (P-90-26)

Revise the corporate and district emergency plans to include detailed guidelines about (1) the responsibilities and duties of emergency coordinators, (2) emergency planning and coordination with all public officials and offshore producers that may be involved in offshore accidents, and (3) accident notification procedures for system controllers and other non-district employees who may receive initial reports of an incident; and ensure that all employees understand their duties and responsibilities. (Class II, Priority Action) (P-90-27)

Also as a result of this investigation, the Safety Board issued recommendations to the Zapata Haynie Corporation, U.S. Department of Transportation, Research and Special Programs Administration, U.S. Coast Guard, U.S. Army Corps of Engineers, 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-90-26 and -27 in your reply.

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

By: 
James L. Kolstad
Chairman