

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: May 7, 1980

Forwarded to:
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Administrator
Research and Special Programs
Administration
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

P-80-26 through -30

About 3:35 a.m., e.d.t., on October 6, 1979, an explosion caused by liquefied natural gas (LNG) vapors destroyed a transformer building at the reception facility of the Columbia LNG Corporation, Cove Point, Maryland. Odorless liquefied natural gas leaked through an inadequately tightened LNG pump seal, vaporized, passed through approximately 210 ft of underground electrical conduit and entered the substation building. One person was killed, and one person was seriously injured. Damage to the facility was estimated at about \$3 million. 1/

At no time during the planning, design, or construction phases of the Cove Point LNG facility were safety analysis performed. The Safety Board first recommended the use of safety analysis to the natural gas industry in 1972 in a special study. 2/ The study pointed out that safety analysis ". . . need not be a highly complicated task." The study noted that by using safety analysis techniques to identify and evaluate system hazards, management would be able to make knowledgeable decisions about which hazards to eliminate, which hazards to control, and the degree of residual risks it was accepting. The safety problem posed by a failed pump seal leaking LNG into the electrical conduit could have been detected during the design of this LNG facility through the application of the most basic safety analysis techniques. The Safety Board is not aware of any LNG facility which has employed safety analysis techniques to identify and eliminate or control system hazards through all phases of a facility's life cycle.

1/ For more detailed information read "Pipeline Accident Report—Columbia LNG Corporation, Explosion and Fire, Cove Point, Maryland, October 6, 1979" (NTSB-PAR-80-2).

2/ For more detailed information read "Special Study—A Systematic Approach to Pipeline Safety, May 25, 1972" (NTSB-PSS-72-1).

The Cove Point LNG facility was equipped with 109 combustible gas indicators (CGIs). CGIs provide the facility's process area with its only means of detecting vaporized LNG leaks by instrument. The 105J pumphouse was equipped with three CGIs located inside about 25 ft above the pumps. Substation No. 2 was not equipped with a CGI. The CGIs in the 105J pumphouse were operating before and after the accident; however, the alarm did not activate even though large quantities of LNG were leaking into the pumphouse. If a CGI had been installed in the substation, it probably would have detected the LNG vapors and activated the alarm in the monitor house.

The United States Coast Guard (USCG) and the Materials Transportation Bureau (MTB) are responsible for promulgating and enforcing safety regulations for LNG and LNG import/export facilities. The USCG is responsible for facility siting as it relates to vessel traffic; fire prevention/protection equipment, system, and methods for use for the entire facility; security of the facility; and all matters pertaining to the facility from the vessel to the last manifold or valve before the LNG storage tank. The MTB is responsible for the facility site, selection, and all other matters pertaining to a marine LNG facility, except fire protection and security, beyond the last manifold or valve before the LNG storage tank. At the time of the accident, no Federal regulations existed for LNG reception facilities. The Safety Board is aware that both agencies are in the process of promulgating regulations.

Title 49 CFR 192.12 requires that LNG facilities be designed, constructed, operated modified, and repaired in accordance with the National Fire Protection Association's Standard for the Production, Storage, and Handling of Liquefied Natural Gas (NFPA Standard No. 59A). NFPA annually publishes The National Fire Codes, which are compilations of the codes, standards, recommended practices, manuals, guides, and model laws. The codes are "purely advisory" according to the NFPA; however, they are widely used as a "basis" for good practices by regulators and insurers.

The Safety Board believes that although the NFPA Fire Codes provide a foundation upon which regulations can be developed, the codes by themselves are inadequate to insure the safety of LNG facilities. The Safety Board has noted the ineffectiveness of NFPA Fire Codes as regulations in other accidents. ^{3/} Furthermore, we believe that the problem does not lie with the fire codes themselves, but rather their misinterpretation by regulators, despite NFPA's admonitions in the preamble, definitions, and introduction of each code that they are "advisory." Therefore, the Department of Transportation must promulgate comprehensive regulations which will insure the safety of such facilities.

The Safety Board is also concerned about the absence of any recognized criteria for the qualifications and insuring the competence of LNG controllers and other personnel. There are numerous occupations which utilize skills similar to those needed by an LNG controller and may affect the health and safety of the public. USCG regulations require that positions, such as the cargo officer on an LNG vessel, require stringent qualifications and demonstrated competence by examination. The Safety Board believes that comprehensive training criteria would establish uniform, adequate standards, which could be modified or improved, as required. Without qualification criteria and a system to test competency, there can be no assurance that LNG controllers possess the knowledge necessary to safely operate LNG facilities. Certification or licensing of LNG

^{3/} For more detailed information read "Marine Accident Report—Tank Barge B-924 Fire and Explosion with Loss of Life at Greenville, Mississippi, November 13, 1975" (NTSB-MAR-78-2) and "Special Investigation Report—An Overview of a Bulk Gasoline Delivery Fire and Explosion" (NTSB-HZM-78-1).

controllers or similar facility personnel, upon satisfactory completion of an examination, is one means of gauging competence.

The Safety Board is concerned that other LNG reception facilities with similar design could experience the same problems as Cove Point. Therefore, the National Transportation Safety Board recommends that the Research and Special Programs Administration:

In addition to recently promulgated Part 193, implement regulations establishing adequate minimum safety standards for liquefied natural gas (LNG) facilities. Such regulations should include, but not be limited to, safety analysis, engineering specifications, inspection, fire prevention/protection, personnel qualifications, and siting. (Class II, Priority Action) (P-80-26)

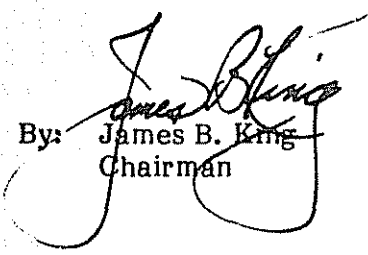
Require that all buildings and similar enclosures within LNG facilities connected by piping or conduit be fitted with an effective means for detecting LNG vapors and alerting company personnel. (Class II, Priority Action) (P-80-27)

Institute an ongoing inspection program for LNG facilities to ensure that they are designed, constructed, and maintained in a safe condition and comply with all pertinent Federal regulations. (Class II, Priority Action) (P-80-28)

Develop criteria for safety analysis for the design of LNG facilities. (Class II, Priority Action) (P-80-29)

Establish a program for licensing or certifying individuals designated to operate LNG facilities. This program should include a comprehensive written examination to ensure the competence of such personnel. (Class II, Priority Action) (P-80-30)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, and GOLDMAN, Members, concurred in these recommendations. BURSLEY, Member, did not participate.

By: 
James B. King
Chairman