NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

FOR RELEASE: 6:30 A.M., E.D.T., JUNE 21, 1976

(202) 426-8787

ISSUED: June 21, 1976

Forwarded to:

Honorable William T. Coleman, Jr.
Secretary
Department of Transportation
Washington, D. C. 20590

SAFETY RECOMMENDATION(S)

I-76-5 through I-76-6

At 4:20 p.m. on April 29, 1975, a Surtigas, S.A., tractor-tank-semitrailer westbound on U.S. Route 277 near Eagle Pass, Texas, swerved to avoid an automobile ahead which was slowing for a turn. The tank-semi-trailer separated from the tractor, struck a concrete headwall, and ruptured; vaporized LPG was released. The ensuing fire and explosion destroyed a building and 51 vehicles. The 51 persons who were in the area were burned and 16 persons, including the truckdriver, were killed.

The National Transportation Safety Board determines that the probable cause of this accident was the evasive action taken by the truckdriver to avoid a slowing vehicle in his path of travel. The cause of the fatalities and injuries to persons in the vicinity was the explosive force and fire, from which they had no time to escape. The rapid development of the explosive force and fire was caused by the gross rupture of the tank.

This is the worst highway accident which involved hazardous materials that the Safety Board has investigated. The Safety Board is concerned because such a catastrophe, though rare, can happen again whenever a loaded bulk LPG cargo tank ruptures in an accident.

In this accident, the pressurized liquefied form and the large quantity of hazardous material being transported were what caused the accident to be so severe. The form in which the LPG was being transported increased the severity of the accident because the pressure of the compressed LPG provided a portion of the energy needed to produce the abrupt, massive breakup of the cargo tank after it was pierced. The pressure also contributed to the rocketing of the tank parts after they separated and to the rapid vaporization and dispersion of LPG released from the tank.

The large quantity of LPG vaporized so rapidly and the vapor cloud engulfed the area so quickly that the victims were unable to respond to the hazard of the LPG when the vapor cloud ignited moments after the crash.

HAR-76-4

The size of the endangered area was determined by the quantity of LPG abruptly released from the broken tank.

The amount of harm which may occur if a bulk LPG tank breaks up in future accidents could be reduced in several ways. The size of the area endangered by the vapors and subsequent fires can be reduced by reducing the quantity in the container. For example, had the LPG shipment been packaged in smaller containers, such as cylinders, it is unlikely that any fatal injuries would have occurred. Another way to reduce the amount of harm is to limit the rate at which the cargo tank breaks apart or the rate at which the contents are released and dispersed. For example, if LPG were transported in self-refrigerated form at ambient pressures, in tanks similar to cryogenic cargo tanks, the tanks would not break apart as readily and the rate at which the contents escape and disperse would be reduced. Such modifications could provide potential victims with sufficient time to diagnose and react to the threat of dispersing LPG in accidents; this should reduce the number of casualties in future accidents.

We recognize that the LPG supply and distribution system is complex, and is geared to a specific shipment form and to present shipment sizes. Once such a complex, mature system is in existence, opportunities for significant changes in established risk levels diminish, and change becomes increasingly difficult. However, this accident demonstrates that persons involved in future accidents of this kind need a better chance to survive. Tehnical methods to accomplish this have not been explored fully, possibly because the problem of influencing the behavior of pressurized liquefied flammable gases released from broken tanks has not been defined precisely in engineering terms. Until a feasible technical method can be found to give potential victims more time for survival, a reduction in the risks of bulk LPG transportation will depend on other improvements. With the potential increase in the size of new LPG cargo tanks under laws which permit increased gross vehicle weights, the need to search for methods to control the effects of LPG behavior in accidents becomes increasingly urgent.

During the investigation of this accident, several violations of the Federal safety regulations were brought to the Safety Board's attention. There is no evidence to suggest that full compliance with all applicable safety regulations would have changed the outcome of this specific accident sequence. However, violations can increase the risk of future catastrophes. Therefore, these violations merit attention.

The Federal enforcement staff was not aware of the Surtigas operations before the accident. This is understandable, considering the small size of the enforcement staff, the broad scope of the trucking operations under its jurisdictions, and the methods presently used to identify bulk LPG carriers for compliance inspections. These circumstances suggest that ...

approaches to identify carriers which transport hazardous materials are required to enhance safety.

One possibility would be to require the registration of persons transporting LPG in bulk by highway. Authority to require registration is provided in Section 106 of the Hazardous Materials Transportation Act of 1974. Implementation of this authority would be expected to improve the level of compliance for several reasons. For example, all carriers would operate at nearly the same level of compliance, because the enforcement personnel could conduct a more effective compliance inspection program. The risk of losing safety registrations would be a strong incentive to achieve a good compliance record. The safety record of registered carriers could be readily identified, and appropriate action initiated by management or compliance inspectors.

The Safety Board is aware of no specific plans to implement Section 106 registration requirements for bulk LPG carriers. The large number of casualties possible in a single bulk LPG vehicle accident and the need for a high level of compliance with safety regulations to keep these risks as low as possible indicate that such a safety registration program would be worth its costs.

Therefore, the National Transportation Safety Board recommends that the Secretary of Transportation:

I-76-5 1. Initiate a research program to identify new approaches to reduce the injuries and damages caused by the dangerous behavior of pressurized, liquefied flammable gases released from breached tanks on bulk transport vehicles. (I-76-5) (Class II, Priority Followup)

I-76-6 2. Establish a regulation to require the safety registration statements authorized by Section 106(b) of the Hazardous Materials Transportation Act of persons transporting bulk shipments of pressurized, liquefied petroleum gases in a form and quantity capable of causing widespread injury and property damage in transportation accidents. (I-76-6) (Class II, Priority Followup)

TODD, Chairman, McADAMS, HOGUE, BURGESS, and Haley, Members, concurred in the above recommendations.

William R. Haley, Jr.

By: Webster B. Todd, Jr.
Chairman

THIS DOCUMENT WILL BE RELEASED TO THE PUBLIC ON THE DATE SHOWN ABOVE. NO PUBLIC DISSEMINATION OF THIS DOCUMENT SHOULD BE MADE BEFORE THAT DATE.