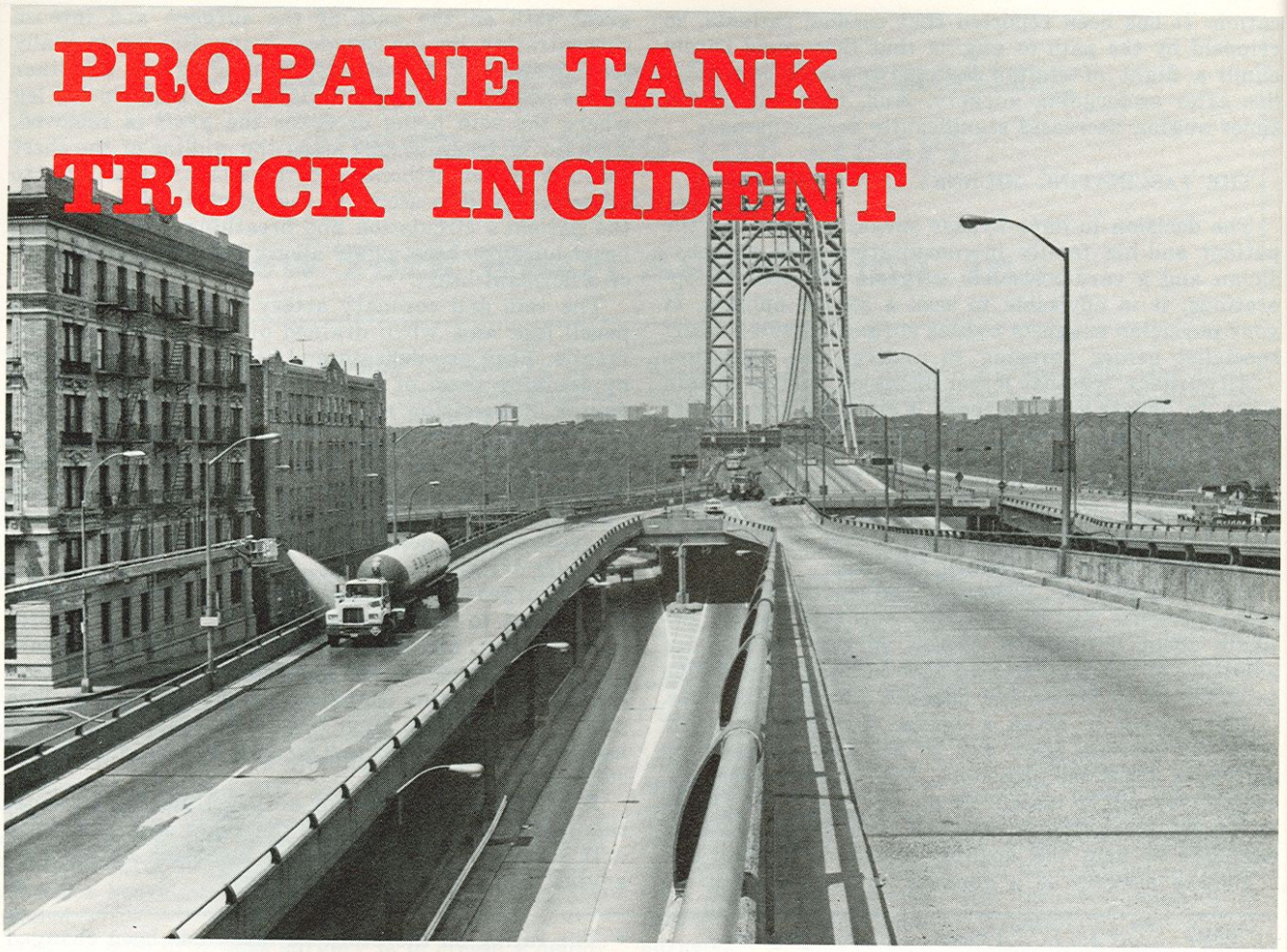
PROPANE TANK TRUCK INCIDENT



. . . courage on the George Washington Bridge

All photos this article by P. Verso, F.D.N.Y. Photo Unit

by **JOSEPH A. CASABURI** *Deputy Chief, 10th Division*

The transportation of hazardous materials throughout this nation's roadways has always been a major concern of fire and emergency personnel. Although there are many legal and jurisdictional aspects regarding the regulations and control of traffic routes, products, etc., fire and emergency personnel must be ready to combat hazardous materials incidents and/or accidents at any time and at any location.

This article focuses on one such hazardous materials incident that occurred in New York City. It is hoped that the experience gained here will assist other fire and emergency forces in coping with any future incident that may occur in their area.

The date of this particular incident, August 7, 1980, was a typically hot, humid summer day. At 10 a.m., the temperature had reached 84°F., and was on its way to a high of 94°F. It was partly cloudy that day, with westerly to northwesterly winds at approximately 10 mph. When this incident occurred, it caused, what some people consider, the biggest and most dangerous traffic jam in New York City's history.

Yet, despite these traffic and weather inconveniences, a truly major fire/explosion catastrophe was averted in the Borough of Manhattan. For many of New York City's citizens and emergency personnel at the scene, it was, indeed, to be remembered as a "hot" day.

THE INCIDENT BEGINS

For Fire Department units, the incident began at 1022 hours, when Box 1732, located at 178th Street and Pinehurst Avenue, was transmitted. Deputy Chief (then Batt. Chief, 13th Batt.) Joseph P. Hovespian, while responding to the scene, was informed by the dispatcher that a severe propane gas leak had developed in a tank truck that was reported stopped on the off-ramp of the George Washington Bridge, Manhattan side. After receiving this information, Chief Hovsepian quickly issued the following orders:

- Arriving units were to set up large calibre streams to cover the tank truck.
- The dispatcher was to request as many available police units as could be obtained to respond to the scene for evacuation purposes and traffic control.

When Chief Hovsepian and responding units arrived at the scene, they found a fully loaded, 9,000 gallon propane tank vehicle venting propane in gaseous form. The propane was being vented from the forward

relief valve located on the top of the truck. The truck was parked on the Manhattan bound off-ramp, adjacent to many multiple dwellings. Chief Hovsepian immediately transmitted a signal 10-75, with a request for an additional engine and ladder company.

Chief Hovsepian interviewed the vehicle's driver, who stated that the tank's 2½" relief valve had malfunctioned.* The driver also stated that he had notified his company, and that a "safety man" was enroute to the scene, as well as a similar unloaded truck (for possible off-loading of the propane product).

Only a spark away from disaster, Chief Hovsepian quickly and correctly sized up the fire and explosion potentials. He ordered all vehicular traffic on the George Washington Bridge, and in the immediate vicinity, halted. It was the first complete shut-down of the fourteen lane, double tiered bridge since its completion in 1932.

First alarm units quickly became engaged in the initial evacuation of nearby multiple dwellings and the setting up of large calibre streams. The members of Tower Ladder 45 set up an unmanned tower ladder stream with a fog tip, and the members of Engine Co. 67 set up an unmanned Stang nozzle.

2ND ALARM TRANSMITTED

Due to an extremely strong odor of gas in the area, the involvement of all first alarm units, and the importance of providing stand-by units, Chief Hovsepian transmitted a 2nd alarm at 1037 hours.

Deputy Chief Joseph A. Casaburi, 6th Div., was already enroute to the scene when the 2nd alarm was transmitted. Upon his arrival, he assumed command and was apprised of all the actions that had been taken by units on the scene. He directed Battalion Chief Michael F. Judge, 16th Batt., to coordinate and supervise the extensive evacuation procedures that were in progress in the adjacent multiple dwellings.

The members of Rescue Co.3, under the command of Captain Frank Barrett, were ordered to assist in the evacuation, and to immediately take explosimeter readings in the basements of the multiple dwellings, the surrounding sewers, the subways, and the Port Authority Bus Terminal. These enormous tasks of evacuation and atmospheric monitoring demanded a herculean effort and remarkable alertness by the members of Rescue Co.3.

The members of the ladder companies, in addition to assisting in the evacuation efforts, were ordered to turn off all oil burners (possible ignition sources) in the basements of all the surrounding buildings. Chief Casaburi also ordered, and reaffirmed, that all streams that were put into operation be set up and left unmanned.

Deputy Assistant Chief Hubert J. Gormley (then Deputy Borough Commander, Manhattan) arrived on the scene and assumed command. After being apprised of all the actions taken and orders given, Chief Gormley special-called an additional ladder company and rescue company, and informed the Mayor's Office on Emergency Preparedness of conditions. He also ordered that the area's IND Subway underground train traffic be stopped. With the Field Communications Unit on the scene, a Command Post was set up, noting each unit's location, assignment, and duties.

* The relief valve had apparently operated and had opened due to an increase in the tank's internal pressure. However, it did not reclose as it should have when the pressure was relieved, and a steady flow of gas continued to escape.

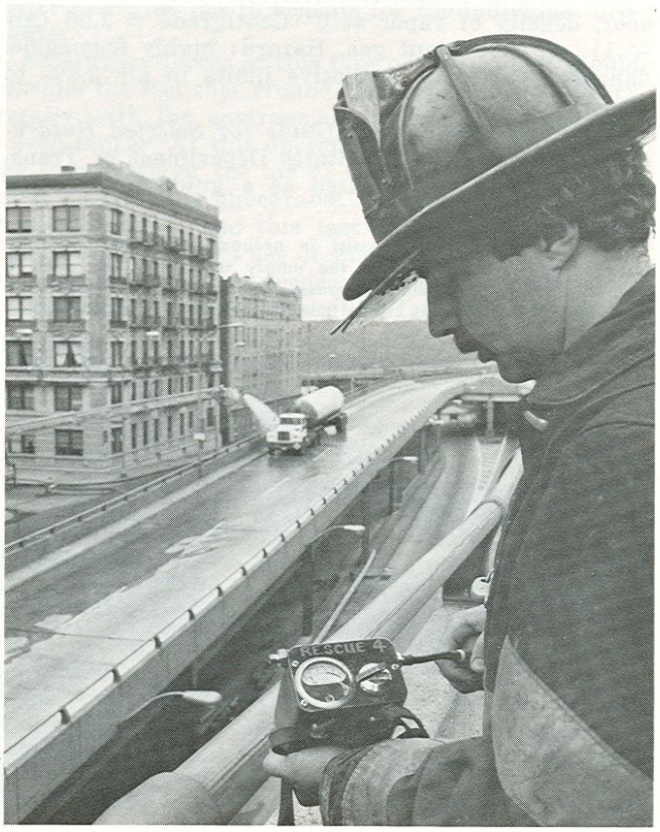
A COORDINATED EFFORT REQUIRED

To some, it might appear that a "leak" of this nature is relatively harmless. Nothing could be further from the truth. It should be noted that the 9,000 gallon tank vehicle was venting propane in gaseous form, under tremendous pressure, estimated to be at approximately 175 psi. Although the fumes were colorless, they were visible as undulations, similar to heat waves. The introduction of an ignition source could have produced a tremendous fire ball, engulfing buildings and structures for blocks around.

It was to this situation that then-Chief of Department Francis Cruthers (retired) responded to assume overall command of the operation. He continued the strategy already implemented and expanded the areas for evacuation. Additional ladder companies were used to evacuate buildings on the north side of the George Washington Bridge off-ramp. The first objective was to ensure an evacuation zone around the involved truck. This operation included the use of many units and, due to the numerous, large, occupied buildings involved (sixteen in all), was extremely time consuming.

Chief Cruthers also coordinated and enlisted the assistance and cooperation of other agencies at the scene. To illustrate the complexity of this task, the following is a partial listing of the people and agencies involved: Emergency Medical Technicians, New York City Police Department, New York City Health Department, New York City Commissioner of Environmental Protection, New York City Emergency Control Board—Office of Civil Preparedness, Port Authority Police, New Jersey State Police, Consolidated Edison Company, tank truck representatives, newspaper and T.V. reporters, and others.

With the "leaking" truck as a backdrop, Fire Department member checks the surrounding area with an explosimeter. This herculean task included the checking of basements in multiple dwellings, surrounding sewer lines, subways, and the Port Authority Bus Terminal.



Responding to the scene to assume overall command of the operation, then-Chief of Department Francis Cruthers (r.) confers with Ass't Comm. John Mulligan and police officials. Chief Cruthers coordinated the efforts of all the other agencies at the scene.

The entire evacuation zone was roped off. Members continued to monitor the area around the "leaking" tank truck with explosimeters. Adjacent sewers were flushed with water and, as an added precaution, the Port Authority Bus Terminal standpipes were charged and made ready for immediate use. Tower Ladder 44 set up their heavy calibre monitor on the upper bridge plaza, and Satellite 2 set up its monitor nozzle and remained in standby position. And, as noted earlier, the members of Rescue Co.3 continued the extensive task of monitoring nearby sewers, basements, the bus terminal, and the area's IND subway system.

PLUGGING THE VALVE

A review of some of the properties of propane gas will give the reader some indication of the severity of the situation. Propane: "Colorless gas, natural gas odor, density of vapor at 0° Centigrade = 1.56 (air = 1), an asphyxiant gas. Hazard: highly flammable, dangerous fire risk, explosive limits in air 2.4% to 9.5%."*

The *Emergency Action Guide for Selected Hazardous Materials*, a United States Department of Transportation text, was utilized as a guide in selecting general and specific safety procedures. (See reproduction of page on "Propane/LPG.")

Fire Department members assist in grounding the leaking truck to a nearby hydrant and to the empty truck that was sent to the scene for off-loading purposes. Members also assisted in the off-loading procedure, while monitoring with their explosimeters.

With the evacuation zone stabilized and secured, attention was focused on the leaking tank truck. In addition to assisting in the evacuation and monitoring efforts (bus terminal and subway system), the members of Rescue Co.4 were directed to work with the New York Police Emergency Squad in securing the involved truck. They assisted in grounding the leaking tank truck to a nearby hydrant and to the empty tank truck that the propane company had sent for off-loading purposes. Rescue Co.4 members also assisted the truck employees in the off-loading operation, while monitoring the surrounding atmosphere with their explosimeters. It was hoped that the off-loading of the propane would result in reduced pressure, thereby allowing the relief valve to reseat itself. As safety precautions demanded that no internal combustion engine be started near the leak, the empty tank truck had been rolled into position alongside the leaking tanker.

With off-loading hoses connected to both trucks, the pressure in the leaking truck dropped to approximately 90 psi. However, this off-loading procedure failed to reseat the valve. The valve was located inside the tank shell, and was not available for visual inspection.

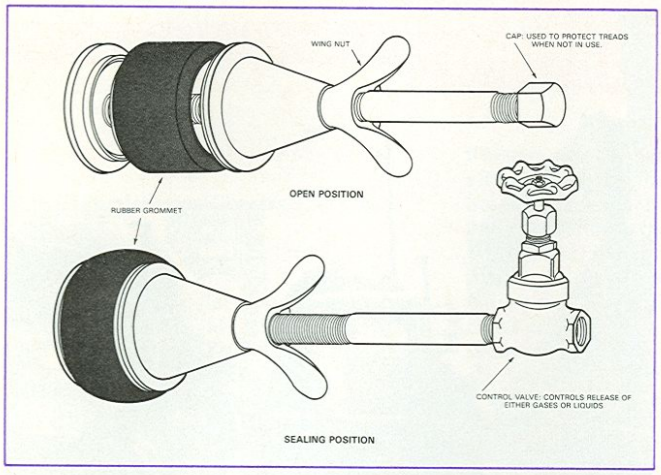
With the reduced pressure having no effect on the reseating of the valve, it was concluded that the relief valve had, indeed, malfunctioned. It should be noted that the indiscriminate capping/closing of relief valves is not recommended. A properly functioning relief valve is, by definition, a safety device which should, at all times, be capable of relieving excess pressure in a container.

Members of Rescue Co.4, under the command of Captain Norbert R. Meehan, in conjunction with the propane company employees, were assigned the difficult task of reseating or plugging the malfunctioned valve. Exercising extreme caution, the members of Rescue Co.4 utilized various plugs and devices, some of which were supplied by the propane company representatives. Although all personnel adjacent to the leaking truck were in danger, the most difficult position belonged to Captain Meehan and Lt. (then Firefighter) Richard S. Rewkowski. They worked directly over the leak, on top of the tank truck. Some of the methods tried included an attempt to close the opening with packing duct sealant, used in conjunction with a wooden board that would be held in place by nylon ropes; and the insertion of a wooden conical plug, hammered in with a rubber mallet. With the potential for a death related incident only a spark away, all members were carefully supervised for safe actions. Despite their efforts to seal the leak, all attempts failed to produce the desired results.

At approximately 1700 hours, a gadget known as a sanitary test plug (see illustration) was provided by Donald Thacke and Christopher Drauer, two N.Y.P.D. Emergency Service officers. The plug is a rubber-nosed device, with a tubular hole running through it to allow gas to escape while it is being inserted.

The very dangerous task of placing the plug into the valve opening was assigned to Fr. John Calderone, Rescue Co.4. Accompanied by representatives from the propane company and Consolidated Edison, Fr. Calderone carefully ascended to the top of the tanker. He inserted the plug into the leaking valve and secured

* *The Condensed Chemical Dictionary*, 9th Edition, revised by Gessner G. Hawley, publisher Van Nostrand Reinhold Co., N.Y., 1977, p. 724.



Above: Illustration of plug that was used to seal the offending leak. *Below:* Heroic members of Rescue Co. 4 at work, actually sealing the leak. Fog curtains, supplied by handlines, Stang nozzles, and a tower ladder protected the area throughout the operation. It was this concerted and dedicated F.D. effort that averted disaster and brought this operation to a successful conclusion.

it with Captain Meehan's personal rope, which was tied around the perimeter of the tank and attached to the chassis of the vehicle. This brave act reduced the flow of gas to a more tolerable level. At approximately 1715 hours, the leak was effectively plugged. Permission was then granted by Chief Cruthers for the final off-loading of the propane gas. Prior to the starting of the truck's engine and pumps for the off-loading procedure, protective fog curtains, supplied by a tower ladder, two Stang streams, and two handlines were positioned to cover both vehicles. These streams continued to operate during the entire off-loading operation. In addition to the water curtains, members of Rescue Co.4 continued to monitor the area around the vehicles with their explosimeters. (Based on their actions, under these most stressful conditions, the members of Rescue Co.4 were awarded a Unit Citation for their excellent teamwork and dedication to duty.)

With the leaking valve controlled, and the off-loading procedure completed, both vehicles, under police escort, returned to the parent propane company terminal in New Jersey. All lanes of the George Washington Bridge were reopened, and traffic began moving once again.

At 1757 hours, Chief Cruthers declared the incident under control, and, indeed, a disaster had been averted.

LESSONS LEARNED/ REINFORCED

As with all major incidents, certain fire/emergency lessons are learned or reinforced:

- The potential for disaster can occur at any time. Preplanning offers the fire/emergency forces some guidelines for action. Prior to this incident, the 13th Battalion, using unmanned tower ladder streams and inline pumping, simulated just such a hazardous materials incident.
- In any hazardous materials accident/incident, the cooperation of all concerned agencies is important. At this incident, many agencies responded and assisted in its final and safe conclusion.
- Although there may be other pressing demands at these types of operations, i.e., movement of traffic, product concerns, economic factors, etc., the first priority should be the protection of local citizens and the operating personnel. All orders given and actions taken should be constantly evaluated in terms of that priority.
- The officer in command must utilize all possible areas of expertise, i.e., skilled personnel, technical handbooks, etc., in order to conclude the operation in as safe a manner as possible.
- All members should be aware that full firefighting gear must be worn at these types of operations. Officers in command of units must guard against the human tendency, at extended operations, to relax such safeguards.
- At these operations, all possible sources of ignition must be avoided. Some examples of positive actions might include: the grounding of the involved vehicles: hand lights taped in either the on or off position, thereby avoiding the accidental movement of the switch; the shutting down of oil burners in the area, etc.
- At incidents of extreme heat and stress conditions, relief of personnel, when possible, should be implemented. This rotation of personnel will allow for an increased readiness of the emergency forces, and foster improved health benefits for the individual firefighter.
- Emergency forces at this type of an incident should consider the fact that ground level conditions may vary greatly with the environment on the top of the involved tanker. At this operation, it was reported that the sound level at the top of the truck, caused by the escaping gas, was unbearable. Communication was almost impossible, and this fact could not be noted at the ground level. The use of ear plugs, with associated hand signals, may be needed to improve communications when operating at similar future incidents.

INCREASED READINESS

Since this near disaster, the New York City Fire Department has supplemented its response capabilities and readiness. Listed below are some of the actions that have been taken.

a. The establishment of the Hazardous Material Response Team (HAZ-MAT) promulgated on Department Order #14/1982. Chief officers can special-call the HAZ-MAT van to the scene of a hazardous materials incident anytime that they feel that their special equipment is needed. The general categories of equipment carried by HAZ-MAT are: radio-active monitoring devices, leak sealing devices, overpak drums, protective suits, and a HAZ-MAT library.

b. A *Hazardous Materials Emergency Response Guide* (Department of Transportation) has been issued to all units.

c. The Division of Training is developing a hazardous materials course at the chief officers' level, and in-service drill periods will be utilized to familiarize units with accepted procedures.

d. The issuance of All Units Circular #267, *Hazardous Materials Response Plan.*

e. The designation of a Hazardous Materials Liaison Officer: John J. O'Rourke, Deputy Assistant Chief of Operations. Copies of all fire, emergency, and special reports regarding hazardous materials shall be forwarded to Operations for his attention (Department Order #48/1982).

f. New York City Fire Department personnel have attended the United States National Fire Academy's training program on Hazardous Materials.

g. Experts from the Division of Fire Prevention, including chemical engineers, are available to provide advice regarding hazardous substances.

h. The Division of Training has released a two-part training film for in-service training via T.V. Channel 31: Part I—Identification of Hazardous Materials, Placards, and Symbols used on Trucks/Trains. Part II —Physical and Chemical Properties; Case Study.

i. The issuance to all units of Safety Tip #122: *Propane Powered Vehicles.*

j. In accordance with the Mayor's Emergency Control Board's "Emergency Management Plan," the New York City Fire Department is assisting in the development of a Contingency Plan for Hazardous Materials Incidents.

Propane/LPG
(Flammable Gas)

Potential Hazards

Fire —May be ignited by heat, sparks, flames.
—Flammable vapors may spread from spill.

Explosion —Container may explode due to heat of fire.
—Gas explosion hazard indoors, outdoors or in sewers.

Health —Contact with liquid may cause burns to skin and eyes.
—Vapors indoors may cause dizziness or suffocation.

Immediate Action

—Get helper and notify local authorities.
—If possible, wear full protective clothing.
—Eliminate all open flames. No smoking. No flares. Keep internal combustion engines *at least* 35 yards away from vapor cloud.
—Keep upwind. Isolate hazard area.
—Evacuate by *at least* 2,000 feet.

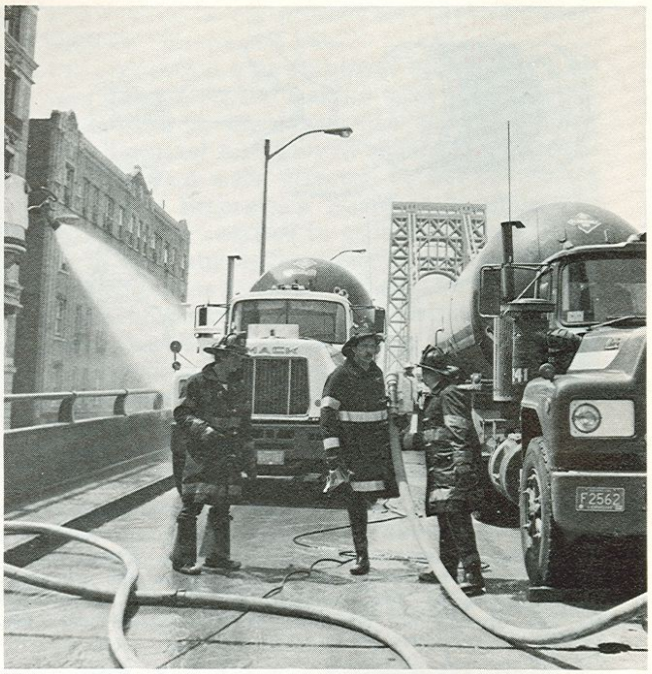
Immediate Follow-up Action

Fire —Let burn unless leak can be stopped immediately.
—Small Fire: Dry chemical or CO_2.
—Large Fire: Water spray or fog.
—Move containers from fire area if without risk.
—Cool containers with water from *maximum distance* until well after fire is out. Apply water from sides of tank.
—For massive fire in cargo area, use unmanned hose holder or monitor nozzles. If this is impossible, withdraw from area and let fire burn.
—Stay away from ends of tanks.
—Withdraw immediately in case of rising sound from venting safety device.

Spill or Leak —Do not touch spilled liquid.
—Stop leak if without risk.
—Isolate area until gas has dispersed.

First Aid —Remove victim to fresh air.
—Use standard first aid procedures.

Shown above is a reproduction of a page from the *Emergency Action Guide for Selected Hazardous Materials,* that outlines general and specific safety procedures to be followed when encountering LPG.



Fire Department members continue monitoring and supervising the off-loading of the LPG. When off-loading was completed, vehicles, under police escort, returned to their parent company in New Jersey. All lanes of the G.W. Bridge were then reopened.

CONCLUSION

It can be seen that codes, jurisdictional laws, and regulations cannot solely be relied upon to prevent a disastrous hazardous materials incident. What also appears to be needed, as evidenced at this incident on the George Washington Bridge, are knowledgeable personnel having the positive attitude that is so necessary for the successful coordination of actions with other agencies on the scene.

In this instance, the bravery and dedication of New York City's firefighting forces was evident. While operating in a potential disaster zone, firefighters engaged in many efforts (evacuation, stretching of lines, atmospheric monitoring, the actual plugging of the leak, etc.) to resolve the problem and bring it to a successful and safe conclusion. They have, one and all, certainly earned a "tip of the helmet." ▲

The author wishes to thank the many people who contributed of their time and effort in the compilation of this article, including Deputy Assistant Chief John J. O'Rourke, Deputy Chief Joseph P. Hovsepian, and Captain Norbert R. Meehan. A special note of appreciation is extended to Mr. Paul F. Stolz, Chief Librarian, F.D.N.Y., for his courteous assistance and quick response to all of my requests.