FLAMMABLE LIQUID INCIDENTS

PURPOSE

The purpose of this M.P. is to describe standard operating procedures for response to incidents involving flammable liquids. The four primary areas of concern are **extinguishment of flammable liquid fires, spills without fire, disposal and firefighter safety.**

Flammable liquids present particular problems for fire protection, health, safety, and environmental protection. The frequency of encounters with flammable liquids makes them a particular concern for the fire department.

The main operational problems with flammable liquids are fire extinguishment, ignition prevention, and disposal of spills. All three of these may be involved in the same incident.

EXTINGUISHMENT

The preferred agent for flammable liquid fire fighting is AFFF/Class B Foam (Aqueous Film Forming Foam). Fire apparatus that carry AFFF/Class B Foam are designated with a CBF (Class B Foam) in CAD and are available on request through Phoenix Regional Dispatch if not already on the incident.

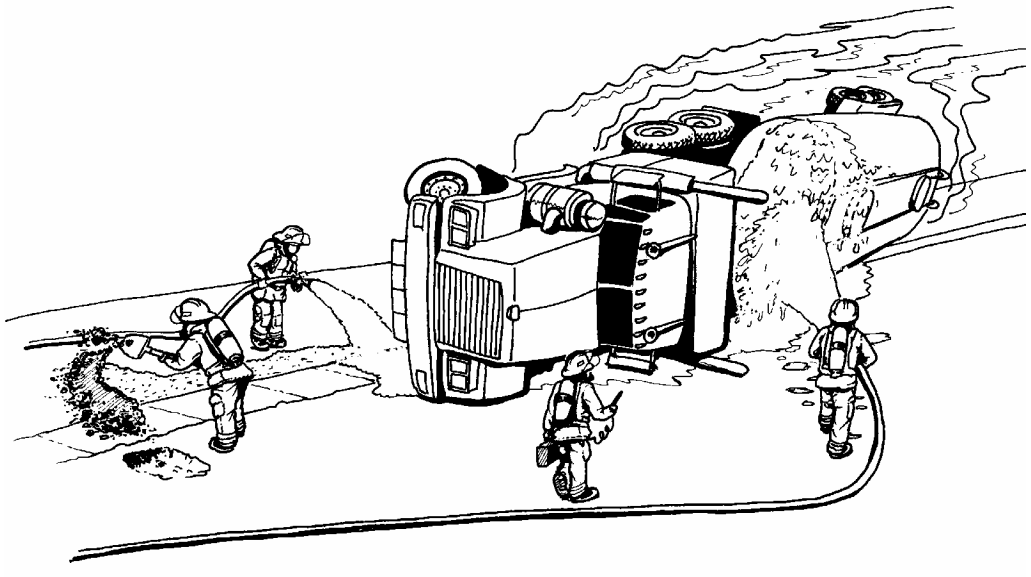
Attack on any flammable liquid fire should be made with Class B Foam when available. When the fuel is ethanol, or ethanol based (E-10, E-85 or E-95), fire attack should utilize an Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF) due to the high alcohol content of the fuel. The use of alcohol resistant class B foam is also required when dealing with <u>any</u> polar (water soluble) flammable liquid. The class B foam should be applied at the percentages specified by the foam concentrate manufacturer.

The PFD currently uses AFFF/AR class B foam concentrate on all class B foam equipped apparatus except for Sky Harbor Airport apparatus. The class B concentrate used by the Airport is AFFF and does not have the alcohol resistive characteristics needed for polar flammable liquids.

The extinguishing action of Class B Foam is based on its ability to rapidly cover the flammable liquid surface with a film. This film prevents the escape of flammable vapors, but may have difficulty sealing against hot metal surfaces. The application of Class B Foam should be gentle to avoid breaking the seal and agitating the liquid below.

Dry Class A compressed air foam (CAFS @1%) can be used to extinguish a <u>small</u> flammable liquid fire i.e. a car with leaking fuel tank. It must be understood that while CAFS can be used as an extinguishing agent, Class A foam has **<u>NO ability to suppress vapors and reignition is an extreme possibility</u>**. If extinguiment with CAFS is being performed during a rescue, continuious application of new foam is required as long as crews are in the hazard zone.

Fires involving a large area of burning flammable liquids may exceed the ability of one hand line to extinguish. It may be more important for Command to wait until there is enough Class B foam on site to initiate a coordinated attack. One 95 GPM class B foam line is needed for every 600 square feet of spill area. The initial fire attack will require 187 gallons of concentrate when used at 3% and 374 gallons of concentrate when used at 6%. Water master streams should be used to cool and protect exposures during the interim.



SPILLS

Flammable liquid spills include spills without fire and any remaining fuel after a fire has been extinguished. In both of these cases, the liquid must be protected to prevent ignition until it can be picked up or removed.

All personnel working around spills must wear full protective clothing to afford protection in case of possible ignition. SCBA must be used in vapor areas. Vapor areas can only be found through the use of combustible gas indicators carried by all Special Operations Response Team units. A Hazardous Materials Response Team company should be dispatched to test the atmosphere if there is a potential question about the flammability.

1. Do not permit the flammable liquid to run-off into storm drains, sewers, or drainage systems. Dam the run-off and cover drains and sewers pending disposal. Consider the use of plastic dike, charged hose lines, black plastic, or dirt to prevent the further spread of spilled material if it can be done safely.
2. Control ignition sources in the area of the spill. Extinguish pilot lights, flares, open flames, etc. Prohibit smoking. Position vehicles to prevent contact of vapor with running engines or exhaust. Disconnect electrical power from a remote location to prevent arc-caused ignition.
3. Cover spills with class B foam to seal vapors. The application will need to be repeated regularly, as the seal will break down in l0 to 15 minutes. One 95 GPM class B foam line is needed for every 600 square feet of spill area. The initial application will require 43 gallons of concentrate when used at 3% and 86 gallons of concentrate when used at 6%. Haz-Mat crews will need to check for escaping vapors with a combustible gas indicator to judge when the seal is breaking down.

DISPOSAL

1. Large quantity spills should be disposed of by a specialized hazardous materials clean-up contractor per C99. This may require a fuel transfer pump or vacuum truck and personnel familiar with fuel transfer precautions.
2. Smaller spills, which cannot be picked up with a tanker, must be absorbed if it has not already evaporated.
3. Special Operations carries small amounts of absorbent but the most often used and preferred method is using sand delivered by the Streets Department. Larger spills will require a street sweeper or a licensed clean-up contractor to remove the sand depending on the Jurisdiction Having Authority (JHA).
4. The Spiller must be given the opportunity to clean up his spill if he can do so, while adhering to appropriate regulations. Otherwise, a specialized hazardous materials cleanup contractor will be called.
5. Large quanity spills require the response of a unit from the Hazardous Materials Response Team in addition to Car 957.

SAFETY

As early as possible, a hazard zone should be established and marked through the use of fire line tape. This zone should include the spilled material in the area down wind of the spill of sufficient distance to account for reasonable vapor travel:

All personnel working in the hazard zone must wear full protective clothing including SCBA with face piece on.

Unless absolutely necessary, personnel shall not work in a spill area. When this is necessary to perform a rescue or to control a leak, the spill must be covered with foam and all possible precautions against ignition must be taken. The area shall be monitored with a combustible gas indicator.

FIRE CODE VIOLATIONS

Most flammable liquid incidents involve Fire Code violations. Have the Dispatch Center dispatch Car 99 to investigate this aspect of the incident and take appropriate action.