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(Inset) Secure containers of flammable liquids before a flood to prevent them from ramming into objects and rupturing. The released liquid can float into other areas where it may come into contact with an ignition source.

flash flood, wherever it occurs, would tend to dissipate in a day or so.

Even in coastal regions, either flash flood or longer-notice flood conditions may exist, depending on the capacity of the land to absorb or delay the run-off from an inundation. Where coastal wetlands have been altered by any encroachment, the natural distribution of excess water cannot take place. Along flood-prone rivers, lakes and coastal areas that have man-made structures on their banks, flood walls and levees are often built to keep the water out of city streets and buildings.

Hurricanes

Hurricanes are often accompanied by heavy rains and, consequently, are the source of much riverine flood damage in inland areas. Heavy river flows from these rains can also weaken levees and dams, causing them to fail. The sudden deluge of released water into protected areas can result in flood damage to facilities in those areas. Exposed locations along the coast will be subject to the effects of heavy rains and the hurricane storm surge

Sheet flows

Another type of flood, sheet flow, is a function of the unique topography such as that found in the western U.S. Where a mountain meets a mountain, the controlling topographical feature is a slope. Water from rain or melting snow travels down these slopes in wide paths, or sheets, on its way downhill. These sheets usually are not more than 1 to 2 ft (0.3 to 0.6 m) deep, but they can cover a large area. Because of the drought conditions usually present in the western U.S., this phenomenon does not occur frequently, but its effect is sudden and severe.

Undersea earthquakes

Tsunamis are huge ocean waves that cause flooding in the coastal areas of the Pacific Ocean. Tsunamis are caused by undersea earthquakes of magnitudes greater than 6.5 on the Richter scale. Although they are rare, tsunamis can grow to heights of 30 to 50 ft (11 to 15 m) as they approach coastal regions at more than 500 mph (805 km/h).

Earthquakes may also cause earth and concrete dam failures, resulting in flooding. Waves, created by the earthquake itself (termed a *seiche*), or earth slumping into a reservoir, can also cause dam failure.

Ice jams

In March and April, rivers that had iced over during the winter begin to melt. Large chunks of ice can create an artificial dam, causing a river to back up and overflow. Spring rains add to this flow since the still frozen ground is unable to absorb the additional run-off.

Flood mitigation

Determining how to mitigate the effects of flooding is dependent upon a careful evaluation of several factors including:

- the expected type and depth of flooding
- the susceptibility of the occupancy to flood damage
- the expected warning time of the flood
- the design level necessary to provide a cost-effective level of mitigation
- determining the level where exclusion of floodwaters by physical barriers may create a collapse problem

Each situation is different; the following suggestions are some ideas on flood protection that you can discuss with your FME&R or Factory Mutual International (FMI) loss prevention consultant. However, before proceeding, thoroughly review all ideas with your insurance company to determine if mitigating flood effects is a feasible option, and if so, what is best — and most practical — for your facility.

The first step is to determine if installing flood protection is a practical option, and if so, to determine the necessary design level. Remember, a