

Disposal	Prior to acceptance
Greenbelts	Locate strategically-must be approved

*developed by the Office of the State Fire Marshal, Fire Engineering Division*

## **4.6 Earthquake-Induced Fires**

Fires following earthquakes can cause severe losses. These losses can sometimes outweigh the total losses from direct damage (such as collapse of buildings). The most dramatic United States example occurred when much of San Francisco was destroyed by fire following the 1906 earthquake.

Many factors affect the severity of fires following an earthquake, including ignition sources, types and density of fuel, weather conditions, functionality of water systems, and the ability of fire-fighters to suppress the fires. Casualties, debris and poor access can all limit fire-fighting effectiveness. Water availability in Riverside County following a major earthquake would likely be curtailed due to breaks in water lines across faults, in liquefiable regions and in areas susceptible to landslides. (See Chapter 1 – Earthquake Hazards.) In addition, above-ground reservoirs are vulnerable and damage to them would also affect fire flow.

Earthquake-induced fires make extraordinary demands on fire suppression resources because of multiple ignitions (as discussed in 4.1). The principal causes of earthquake-related fires are open flames, electrical malfunctions, gas leaks, and chemical spills. Downed power lines may ignite fires in the unlikely event the lines do not automatically de-energize. Unanchored gas heaters and water heaters are common problems, as these readily tip over during strong ground shaking. State law now requires new and replaced gas-fired water heaters to be immobilized.

The California Division of Mines and Geology Newport-Inglewood Earthquake Scenario (Topozada and others, 1988) indicates that fire units should prepare for thousands of damaged and leaking mains, valves, and service connections including broken pipelines. These will occur along, and adjacent to, fault rupture. The Southern California Gas Company has prepared by replacing distribution supply pipelines with resistant (flexible) plastic polyethylene pipe, and has an overall ability to isolate and shut off sections of supply lines when breaks are serious.

### **4.6.1 Natural Gas Fires -- Northridge Earthquake**

The moderately-sized,  $M_w$  6.7 Northridge earthquake of 1994 caused were 15,021 natural gas leaks. In the aftermath of the earthquake, 122,886 meters were closed by customers or emergency personnel. The majority of the leaks were small and could