Exterior Sprinkler Protection Provides
Defenses Against Watershed Fires

Who says that lightening never strikes in the same place twice? Year after year, decade after decade the combination of long dry summers and hot desert winds has resulted in repeated brush fires in Southern California. These "devil winds" have resulted in the destruction of literally thousands of dwellings that were built in the urban interface.

Ever since Southern California began its major growth and development the fire services have been searching for a solution to how to keep these catastrophic fires from reoccurring. Extensive fire prevention efforts have been aimed at reducing the frequency of fires. That has been Smokey Bear's contribution. Another defense has been an all out attack at the shake shingle roof industry. This has been blunted by the lobby efforts of that industry. We have not eliminated the most important single factor to conflagration conditions; flying brands landing on roofs.

Typical of almost all film coverage of these fires is one scene. While the firefighters are doing "their thing" in advance of the flame front homeowners by the hundreds can be seen in these film clips wetting down their roofs with garden hoses, lawn sprinklers and any other kind of mechanism they can find in attempt to keep flying brands from igniting the combustible roof covering. Observers of this phenomenon have been asking themselves one basic question for many years. Why not build a system that would do this automatically?

Several attempts have been made to do just that. There have been numerous designs, some created by individuals trying to establish a business and some created by individuals in their own special interest. Unfortunately most of these designs have all been based upon a dependency on the domestic water system. Additionally many of these designs were merely extensions of an improvised lawn sprinkler type systems that were placed haphazardly on the roof disregarding the factors of wind and the density of water distribution.

In the wake of the Panorama fire in San Bernardino there was a system developed, however, that seems to address both of these problems quit satisfactorily. A former television professional, John Nafarrette, who had edited literally thousands of feet of videotape of major brush fires, combined his observations with that of a plumbing contractor, Jerry Gort, to come up with a unique and apparently effective scheme for building exterior sprinkler systems to protect homes. The firm called Specialty Fire Protection Systems Incorporated has fabricated a full-scale mock-up of this system in the Devore area of Southern California. The system has been demonstrated numerous times for fire prevention officials in order to acquire input from fire professionals regarding the practicality and limitations of such

technology. Recently some full-scale demonstrations were given of this design in the presence of both fire prevention and fire suppression officers.

The system designed is essentially the reverse of an interior sprinkler system. It consists of a series of pipes that are laid branch-like across the top of the roof and down the sides of the roof. These copper lines are designed to provide a nozzle to protect specific exterior openings such as door, windows, garage doors and so forth. A specially designed sprinkler nozzle has been strategically placed in the copper piping to provide overlapping spray patterns once the system is charged. The nozzle that is used is basically a configuration that is used in lawn sprinklers. It has been slightly modified for the application of exterior fire protection.

This entire branch-like exterior sprinkler system is fed from an underground water reservoir. This system is not dependent upon the domestic water system. The entire design is based on the premise that the domestic water system may be compromised or eliminated by either other individuals' misuse of water or the fire department depleting it. This underground reservoir is located right next to the residence and is supplied with a propane-fueled pump.

The reservoir size has been carefully calculated to provide a minimum of thirty minutes water supply with the system operating at full bore. This means that the reservoir size varies in accordance with the size of the structure. A very small building with a minimum number of heads would not require a very large reservoir. On the other hand, a five thousand square foot single family dwelling with a large number of heads could perhaps require a reservoir of up to 500 or 1,000 gallons. The underground reservoir has a connection with the domestic water system so that it can be refilled if the domestic system is still available. However, water cannot be taken out of this reservoir and put back into the domestic system. It is basically a one-way arrangement.

Likewise the pump size is calculated according to the hydraulics of the density required to provide adequate coverage for the size of the building. A very small building with a small number of heads would not require a very large pump. Conversely, our five thousand square foot structure mentioned earlier could require a pump of rather significant size.

The system is designed to be operated manually at this point. That is to say that if an individual felt that their home was being imminently threatened by the fire of flying brands they would go to the exterior, throw a switch which would activate the starter motor. The starter motor in these cases is powered by a battery which is fed with a trickle charge from the electrical system on a daily basis. Some designs could also incorporate the possibility of a pull starter in the event of battery failure. Once the system is started there is nothing more for the homeowner or other party to accomplish. As a matter of fact, the system is so designed that even if the homeowner were not present firefighters or informed neighbors would have the ability to activate the system themselves. The electric switch that monitors the running of the

pump also has a low-level water switch. This means that after the system has been functioning for an extended period of time if the reservoir runs dry the pump will turn itself off. If the domestic water system is capable of resupplying the reservoir and the reservoir refills to an operational level the pump can then be reactivated.

Hydraulic calculations for the use of this system are very important. The designers of this concept have spent a considerable amount of time studying the spray patterns of their nozzles as they relate to the density of water distributed on a shake shingle roof. They have studied the patterns and pressures required in order to provide adequate streams even in the face of gale-like wind forces. As you will note in one of the illustrations of the photos accompanying this article the nozzle does not provide a fine mist, rather it provides small straight stream type patterns that are designed to soak the roof by runoff.

As a result of this type of research Specialty Fire Protection Systems Incorporated has determined that each and every system for each and every home must be calculated in order to prevent dry spots or ineffective operation under actual fire conditions. This precludes the development of a "kit" system that can just be arbitrarily thrown upon the roof and considered adequate.

Some of the interesting aspects of this technology is the fact that this sort of protection can also be used on homes that do not have combustible roofs but do have large numbers of openings that could be exposed to exposure fire. Classic examples of this could be homes that have tile roofs but have exterior buildings with wood siding exposed to the fire spread, or buildings with noncombustible roofs that have large patio door openings facing the watershed.

This concept, while not exactly in its incipient stage, still has areas to grow into. Some of the research and comment received by the designers of this system are: to consider hooking up the pump and piping mechanism to the pump circulating water out of swimming pools or Jacuzzis. Secondly, one suggestion has been to design a collector system so that as the water runs off of the roof into the drains around the house that it can be recycled and turned back into the reservoir to extend the operating time of the system. Other suggestions include linking this technology up with some type of infrared technology so that the system could actually be activated because of exposure to direct flame. A Design could incorporate an infrared scanner mechanism that would watch the hillside and whenever flame appeared the system would be automatically activated. This technology even extends into a concept of hooking up a bimetallic wire down on the bottom of a slope or in the near vicinity of this kind of an installation and whenever the bimetallic wire was exposed to heat it would react closing the circuit and activating the system.

One of the questions that always come up with regard to this kind of a system is that of cost. These systems are not cheap. They have been estimated to run as little as five or six thousand and as high as eight or nine thousand dollars for some very complex installations. On the other hand one has to

consider what this cost factor is over the life of a home that could be exposed to fire as much as five or six times during the lifetime of the structure. What is the cost of eight thousand dollars to a home that has a selling price in the range of a half a million dollars? What are the possible implications of such systems to reduce the exorbitantly high fire insurance premiums people must pay when they face an urban watershed interface? The questions of economics is probably going to be one that will be discussed extensively over the next ten or fifteen years.

Most fire departments that are facing catastrophic types of fire loss are also facing catastrophic financial conditions with relation to manpower and resources to provide fire defenses. An eight thousand dollar installation to protect a single dwelling may seem high on the front side. On the other hand if you decide that up by thirty years it drops down to less than a couple of hundred dollars per year. Paying for such an installation in today's dollars may make tremendous amount of sense ten to fifteen years from now when the cost of manpower and providing manual fire defense forces has skyrocketed beyond all of our expectations.

The availability of such technology may provide modern and progressive fire officers with an entirely new alternative for dealing with new tracts and developments as they encroach upon the urban wildland interface. It is conceivable that entire tracts of homes could be protected by such an installation at the time of construction. Special provisions could even be made to allow fire department pumpers to have a "fire department connection" to boost the pressure of such systems at the time a fire actually strikes a group of homes.

Seasoned firefighters have long recognized the fact that fighting these types of fires is like guerrilla warfare. One does not make indiscriminate use of their water. If fire departments could support such systems that were in existence in blocks of homes, it is conceivable that the actual operating effectiveness of a single engine company could be tripled or quadrupled at the time that a fire front would strike a line of homes.

Fire marshals and plan-checkers are very sensitive to the fact that every time they make a decision on fire protection they're costing the homeowner or builder dollars. These systems may not be the ultimate solution to the watershed interface. However, they appear to be much more viable than the currently existing alternatives. If we cannot eliminate the combustible roof problem, if we cannot provide enough manpower to put a fire truck between every other home during these conflagration conditions and if we cannot assure the reliability of the domestic water system to provide fire flow during peak demand then it is possible that the use of such technology as proposed by Specialty Fire Protection Systems will find its nitch in the arsenal tools used by a modern fire department.