

STUDY ISSUE PAPER ON THE RESIDENTIAL SPRINKLER ORDINANCE

REPORT IN BRIEF

In 1996, Council asked staff to study and report on "City imposed mandates." The report was completed by the Office of the City Manager and presented to Council. The Residential Sprinkler Ordinance was one of the items listed in the report as a City imposed mandate. At that time, Council included this ordinance for further study. This report provides more detailed information on the City's existing Residential Sprinkler Ordinance.

Staff recommends that Council take no action and keep the ordinance as written.

BACKGROUND

At the December, 1995, Council Study Issues and Budget Workshop, Council directed staff to prepare a report reviewing City imposed mandates. Council adopted a workplan for this study at the March 19, 1996, Council meeting. Council decided to limit the study to four areas: the building code, the fire code, development requirements and regulatory ordinances. The "City Imposed Mandates Study" report was completed and presented to Council on July 30, 1996. Council requested that the Residential Sprinkler Ordinance be further studied. This report provides detailed information on the existing ordinance and issues relating to residential fire protection.

Existing Fire Problem

Nationally, fires injure and kill more people than floods, hurricanes, tornadoes, earthquakes and other natural disasters combined. Most often, the public hears about spectacular fires in office buildings and public places, but the great majority of the fire injuries and deaths occur in one's own home. National statistics show that about 80% of all fire deaths occur in residential properties. The heaviest toll is taken on the elderly, the disabled, the poor and the young.

Locally, Sunnyvale continues to have one of the lowest fire losses and fire death rates for cities with populations over 100,000. However, from 1976 through July, 1997, there have been twenty fire related fatalities in Sunnyvale, two of them on-duty Public Safety Officers. Sixteen of these deaths were from 1976 through 1985, only four have occurred in the last eleven and one half years. Of the twenty deaths, sixteen occurred in residential dwelling fires.

For Fiscal Years 91/92 through 95/96, 74.8% of fire suppression responses to building fires were to residential properties. According to the State Fire Marshal's Office, this percentage of residential responses is consistent with other jurisdictions throughout the State.

Sunnyvale's Residential Sprinkler Ordinance

An ordinance requiring a fire sprinkler system in all residential structures was first adopted by Council on March 24, 1987 (RTC 87-146, included as Appendix A). This ordinance placed the National Fire Protection Association (NFPA) requirement for residential sprinklers into the

Sunnyvale Municipal Code. On February 6, 1990, Council approved the adoption of the 1988 Uniform Fire Code with amendments (RTC 90-004). Included in the amendments was the continuation of a requirement that all new residential structures have a fire sprinkler system installed. Also included was a requirement that the ordinance applied to all existing structures when "additions, alterations, or repairs are made in excess of fifty percent of the floor area within a twelve month period."

The ordinance was amended by Council on March 19, 1991 (RTC 91-096), to clear up problems with interpretation of the fifty percent rule (addition, alteration, or repair part of the ordinance). The amended ordinance now made it clear that only the living area portion of the structure would be included in the square footage calculation.

Proponents and Opponents

The main opposition to residential sprinklers comes from the Building Industry Association (B.I.A.). Their concern is with the increase in purchase price of a house when sprinklers are required. The B.I.A.'s opposition has included filing lawsuits against several jurisdictions in an attempt to prevent them from enacting residential sprinkler ordinances. To date they have been unsuccessful.

Their argument has been that the benefit of having a sprinkler system in a house does not outweigh the economic impact of the cost of a sprinkler system. Sprinkler systems for new construction cost approximately \$1.55 per square foot. The cost to retrofit a home can be up to 50% higher per square foot. The chart below provides some estimates of the cost for projects of different sizes.

PROJECT	Total Cost of Construction	Cost of Sprinklers	Sprinklers as Percent of Total Cost
600 sq. ft. <u>addition</u> to 1200 sq. ft. house	\$52,200	*\$3,000	5.7%
1800 sq. ft. <u>new</u> house	\$161,000	*\$3,000	1.9%
600 sq. ft. <u>addition</u> to 2400 sq. ft. house	\$49,200	\$0	0.0%
3000 sq. ft. <u>new</u> house	\$268,150	\$4,150	1.5%

Source: City of Sunnyvale, Building Division valuation tables and consultation with plumbing contractor.

* Minimum charge applies

The genesis for requiring residential sprinklers goes back the mid-1970s. The National Commission on Fire Prevention and Control conducted exhaustive research in examining the fire problem in the United States. They concluded that the United States had one of the highest death and injury rates due to fire. As a result of the Commission's work, legislation was enacted in the U.S. Congress that created the U.S. Fire Administration. The Administration's objective was to reduce deaths from fire by 50% before the decade of the 1990s. From 1977 to 1981, NFPA statistics report an average of 7700 civilian fatalities each year attributed to fire. From 1990 to

1994 the national fire fatality rate averaged a little more than 4500 deaths a year. This did not meet the 50% reduction goal (to 3700 deaths), but it was a significant reduction.

In California, the State Fire Marshal's Office keeps statistics for the entire state through the California Fire Incident Reporting System (CFIRS). A review of these statistics for the twenty year period, 1974-1994, showed an improving fire safety picture for the state. According to the National Fire Protection Sprinkler Association June, 1997, newsletter, "The population of the state increased 33.7% during this time, to 31.9 million, but total fires dropped 48.7% and the total number of residential fires dropped 58%. On top of this, the civilian deaths and injuries dropped by 52.8% and 43.4% respectively. Obviously, smoke detectors and fire sprinklers have begun to show their real life saving potential in this state."

Most experts believe, and formal studies confirm, that the primary reasons why the death and injury rate has decreased so dramatically are due to fire prevention inspection programs, widespread use of smoke detectors and the increasing installation of sprinkler systems in both commercial and residential buildings.

In 1973, the NFPA established a committee to develop a new residential sprinkler standard for one and two family dwellings and mobile homes. The first one, NFPA Standard 13D, was introduced in 1975 and called for residential sprinkler installation in new construction. Additional discussion and testing occurred over the next several years. In 1978, the U.S. Fire Administration and the Factory Mutual Research Corporation conducted a series of fire tests using the recommended sprinkler system design. The results of their tests demonstrated the effectiveness of sprinklers in residential fires.

At the NFPA meeting in San Diego in 1980, NFPA Standard 13D, Sprinkler Systems in One and Two Family Dwellings and Mobiles Homes, was adopted. A residential NFPA 13D system differs from a conventional sprinkler system in several ways: less restrictive engineering design and review, reduced water supply requirements, use of the same water line for the sprinkler system and the domestic water supply, and no maintenance requirements.

Locally, in the 1980s, the Public Safety Department added two components to its strategy to reduce injuries and deaths from fire. The first part is having a smoke detector in the home. Smoke detectors provide early warning of a fire so any occupants can escape before the fire becomes deadly.

The second addition to the strategy is having a sprinkler system in the home to reduce injuries, deaths and property damage. Requiring a sprinkler system in residential dwellings was a specific part of the strategy, as approximately 75% of fires in the United States are residential. Because the Public Safety Department does not conduct fire and life safety inspections of homes, many fire hazards can exist for years without correction. Having a passive fire extinguishing system in the home provides an extra measure of protection for the occupants, even if the smoke detector is absent or not functioning. A sprinkler system in a home will usually extinguish a fire prior to the arrival of the fire fighters. A fire in a house without a sprinkler system will become much larger and often engulf a major portion of the dwelling prior to the fire division's arrival. Controlling a fire and reducing its spread also allows people more time to escape. This is particularly important

for the elderly, the very young and disabled persons, who need extra time to safely exit the home. Residential sprinklers add a fire suppression element to the early warning of smoke detectors. It is the ability of sprinkler systems to control or extinguish fires in their early stages that makes them such a critical tool in fire protection strategy.

It is a proven fact that automatic sprinklers can save lives and property. It is also a fact that most fire fatalities occur in residential fires. However, Operation Life Safety (O.L.S.), an International Association of Fire Chief's program aimed at promoting fire safety, estimates that only approximately 1% of homes across the nation are sprinklered. There are several reasons why residential sprinklers are not more widely accepted:

Residential fires are not as newsworthy as large commercial fires. Therefore the problem is not widely recognized outside of the fire service community.

"Mini-max" building codes, which prohibit communities from making their local requirements more stringent than state codes. In 1985, four states had such building codes. In December, 1994, Fire Chief Magazine reported that sixteen states had this type of code.

Misconceptions that many people hold about sprinklers. For example, that water damage from sprinklers is extensive (the flow from sprinklers is only 10-18 gallons per minute, or that every sprinkler in a room or on the system will go off at the same time (93% of fires are put out by one sprinkler head).

Aesthetics - when people think of sprinklers, they may think of the exposed pipe and sprinkler heads that are common in commercial facilities. This is no longer the case for residential application. New technology has produced heads that can be inconspicuously mounted.

The "cost versus benefit" issue, mentioned above. The building industry is the primary voice in this area. Builders are understandably reluctant to add to the cost of new construction, especially due to high price of housing in the Bay Area and at a time when there is already concern that many people are priced out of the new housing market. However, this is the same attitude that prevailed when smoke detectors were first introduced in the 1970s.

Important research is in progress to advance the technology, reduce the cost and identify ways to overcome barriers to widespread use. Innovations like combining the sprinkler system with the in-home plumbing system, a less burdensome design and permit process, acceptance of building code alternatives and new ideas in site plans for subdivisions can reduce the cost a sprinkler system.

Although the greatest benefit to the widespread installation of residential sprinklers will be the lives saved and the injuries prevented, lower property losses are a secondary and substantial benefit. A committee from the insurance industry sponsored a number of test fires in Los Angeles and concluded that residential sprinklers had the potential for reducing homeowner's claim payment expenses.

At the present time, insurance discounts for having a sprinkler system is more common for multi-family units or institutional uses of residential properties, than they are for single family dwellings. In general, the Insurance Service Office (ISO) recommends a 13 percent discount for a one or two family residential dwelling that has a sprinkler system meeting the NFPA 13D standard. Additionally, they recommend an additional 2 percent discount if smoke detectors are also present. This is a reduction off the total premium, not just the fire hazard portion. However, insurance companies more commonly offer a 10% discount. While this would not pay for the system over a short period of time, as is the case in many commercial installations, the increasing expense of insuring a single-family home makes this a significant incentive.

In Orange County, California, two similar apartment fires occurred two days apart during June, 1993. One building was not sprinklered and had a loss of approximately \$950,000; the other building was sprinklered and had a loss of approximately \$1000. Additionally, the fire in the sprinklered building required less than 10% of the fire department resources of the fire at the non-sprinklered building. Additional comparison details are in Appendix B.

A recent study of the effectiveness of sprinkler systems was just completed by the Scottsdale, Arizona, Fire Department. Scottsdale has a residential sprinkler ordinance similar to Sunnyvale's. The study reported on 109 fires in sprinklered buildings during a ten year period. Sixty five of the fires were in commercial buildings, 26 were in multi-unit residential dwellings and 18 were in single unit residential dwellings. There were a total of 8 lives saved and the average loss per fire was \$1945. This compares to a \$17,067 dollar loss from fires in unsprinklered buildings during the same time period.

LOCAL HISTORY SINCE ADOPTION

Since the 1987 adoption of the ordinance there have not been any fires in single family residential dwellings required to have sprinklers by this ordinance. However, there have been nine fires in multi-unit residential buildings where the sprinklers have reduced property loss. In one case it is strongly believe the sprinkler system saved a life.

Generally, the proponents and opponents of requiring residential sprinklers, and the arguments for and against, remain the same today as they were twenty years ago.

RELATIONSHIP TO FIRE SERVICES PROGRAM OUTCOMES

The current trends at the national, state, and local levels are to attempt to reduce deaths from fire. This movement was started in the mid-1970s and is continuing today. The movement is mainly concentrated at the loss of life due to fires in residential dwellings. One of the Fire Services Division Service Delivery Plans Outcomes (422C) is to minimize the impact of fire on the lives, property, and the well being of the community through a comprehensive fire and life safety protection program, so that :

1. fires are contained to the structure of origin, and
2. a fire loss of .015% of the total assessed value protected is maintained

Staff believes that the existing residential sprinkler ordinance contributes significantly to accomplishing this outcome.

THE FUTURE OF RESIDENTIAL SPRINKLER ORDINANCES

The United States Fire Administration (USFA) has supported research in the last 15 years that has produced significant technological gain. Basic technology has been improved, providing faster activation of sprinkler systems. Sprinklers for residential use currently exist that have a response time five times faster than commercial sprinklers. Sprinklers have been adapted to meet the particular requirements of all types of residential housing. Sprinklers are no longer unattractive, obtrusive eyesores to the homeowner and increasingly less demanding in terms of water flow. In Sunnyvale, the sprinkler systems operate off the domestic water supply and do not require any special lines or pumps. Low water volume units with self-contained water supplies have been developed to meet the particular requirements of manufactured homes, where fire danger is severe.

Although the Uniform Building Code, which the City of Sunnyvale adopts, addresses most of the building safety issues, it does not adequately regulate some of the sprinkler related fire and life safety issues. These issues have been addressed through the adoption of the Uniform Fire Code (with State amendments), NFPA standards and local ordinances. In California alone, over 85 cities have adopted a residential sprinkler ordinance. More frequently than ever, cities are adopting ordinances that have sprinkler requirements, both residential and commercial, more restrictive than the Building Code. This is due to the ever growing demand for the Fire Service to reduce the number of fire related deaths in the community and develop more economical means of fire protection for residential dwellings. It is anticipated that more cities in California and across the United States will adopt residential sprinkler ordinances in the future.

Legal Issues

Recently there has been an attack on the right of individual Cities to enact residential sprinkler ordinances. The main participant is the Building Industry Association of Northern California (B.I.A.). In 1994 the B.I.A. brought legal action against the City of Livermore. Their first attack was to determine if the City of Livermore had the legal right to amend the Uniform Building Code. The Court ruled that a City could add its own amendments. They next attacked the City of Livermore's "Finding of Fact," arguing Livermore had erred in their findings. The court ruled in Livermore's favor, setting a precedent for a City's right to have a residential sprinkler ordinance. The B.I.A. appealed to the California State Supreme Court. In 1996, the court refused to hear the case, upholding the decision of the appellate court.

CONCLUSION

Residential sprinklers have the potential to reduce injuries and deaths attributable to fire, especially people most at risk (the elderly, the very young, and the disabled). They are also a practical way to reduce property damage from residential fires and the Public Safety

Department's costs associated with fighting fires. Sprinklers can do this without jeopardizing the affordability of the housing.

Saving lives from death by fire is the primary outcome adopted by Council for the Fire Services Program. Residential sprinklers have been and still are a significant part of an overall strategy of the Fire Services Division to reduce fire deaths. Over the last ten years it has been a successful strategy. The one time cost of installing sprinklers in a new home or retrofitting them in a remodeled home is a reasonable price to pay for the long term benefit of having immediate fire protection 24 hours a day.

FISCAL IMPACT

None

PUBLIC CONTACT

Council Agenda
Chamber of Commerce
Building Industry Association

ALTERNATIVE COURSES OF ACTION

1. Take no action and leave the Residential Sprinkler Ordinance as written.
2. Provide direction to Staff to modify the Residential Sprinkler Ordinance.
3. Request more information on this issue or provide other direction to Staff.

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ATTACHMENTS

Appendix A: RTC 87-146 - Study and Recommendations for a Residential Sprinkler Ordinance
(without attachments)

Appendix B: Comparison of two apartment fires in Orange County, California

Appendix C: Workplan for Review of Residential Sprinkler Ordinance