

# The Case for Residential Fire Sprinklers

Forty year old home fire sprinkler requirement in Scottsdale, Arizona, demonstrates dramatic community benefits.

- Real-World Data from Home Fire Events
- Sprinkler Cost-Benefit Breakdowns
- Myths and Facts

From the Editors of Green Builder Magazine

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In 2026!**



# Notes from the Editor's Desk

## Flash Forward!

**F**our decades of data tell the story: Adding fire sprinklers to housing drastically reduces risks, at an installed cost that's negligible for builders and developers who see the whole picture.

About 20 years ago, I wrote about the dire risks of deadly home fires in new homes. I interviewed firefighters, builders and others, to get an accurate sense of WHY firefighters were ringing the alarm bells. I learned that many trends in home design and materials had literally added fuel to the home fire “time bomb.”

For example, the popular “open floorplan” in many modern homes changes the speed and method by which fires spread. When fueled by hot-burning synthetic furniture, they can “flash over” in minutes, giving occupants little time to escape. See the more detailed illustration on page 11.

At the same time, the toxicity of home fire smoke is worse than ever. Plastics, synthetics polyurethane foams and other engineered materials burn very fast, and produce highly toxic smoke compared with natural fibers common decades ago. Plus, today's widespread reliance on lithium-ion batteries and electronics creates many more opportunities for fast-growing home fires.

Ultimately, this deadly combination puts lives at risk foremost but also makes fires harder than ever to extinguish.

The good news, however, is that home fire sprinklers change the equation. As you'll learn in this report, they reduce deaths by 80 to 90 percent, reduce property damage by more than 60 percent (on average), at the same time lowering overall infrastructure costs for new developments—helping to compensate for the added cost of installing sprinklers. Let's look deeper.



**—Matt Power  
Editor in Chief,  
Green Builder Media**

# THE TRUE COST-BENEFITS OF HOME FIRE SPRINKLERS

Having just wrapped up a 30 year career with the fire service in Scottsdale, Arizona, Kerry Swick has something to leave behind that few of us can claim: a legacy.

**A**s a soon retiring Assistant Fire Chief, Swick has been tracking fire sprinkler successes since they first hit the residential scene in the 1980's. Three decades later, he has the case studies, the experience and the data to weigh their financial implications. Since Scottsdale passed the requirement, more than half the city's housing stock, 50,000 homes are protected with fire sprinklers.

"Way back in 1981, when I joined the fire service, I was a young kid, you know, I was working for Rural Metro in Scottsdale. And I heard fire chief Jim Ford, who was a captain at the time, talking about how he wanted to protect homes with fire sprinklers.

"I had read America Burning a few years earlier, so I knew that 80 percent of fire deaths were happening in homes. That was just the fact."

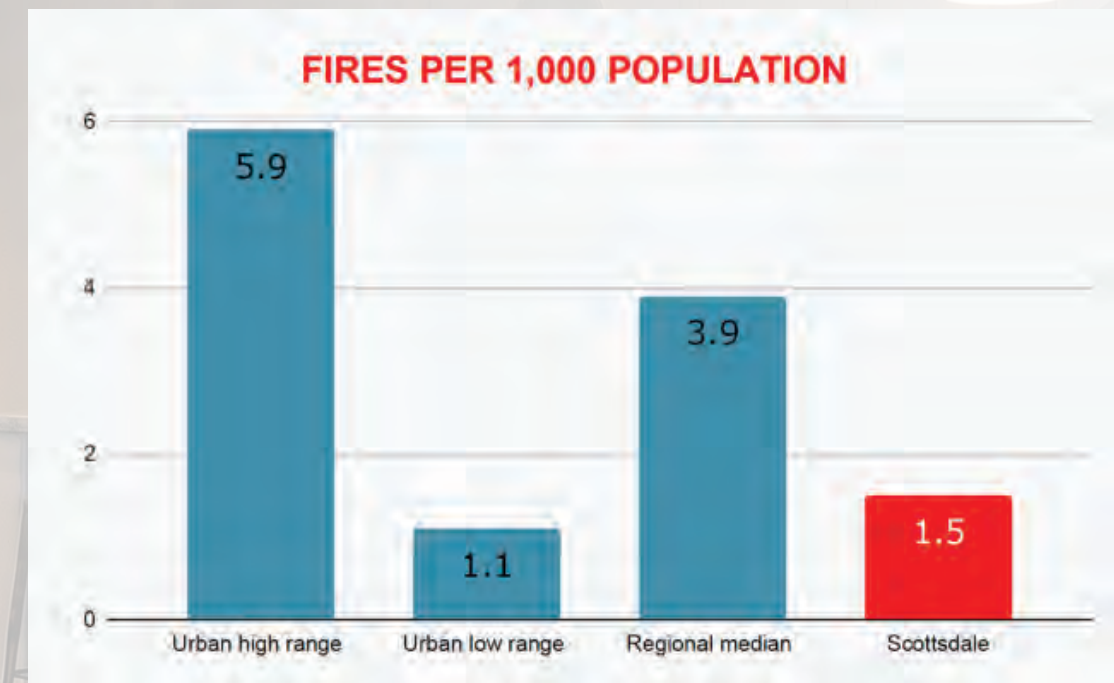
His colleagues had noticed that commercial buildings typically had fewer casualties, suffered less damage—in large part because they had been "sprinklered" by code for years. Why weren't residential buildings taking advantage of the same technology?

Not surprisingly, the first reaction from the building community was resistance. They viewed sprinklers as another unnecessary regulatory cost. But that's where Ford, who initiated the sprinkler "transition," urged his colleagues to play the long game. They began to look more thoroughly at the OVERALL impacts (what some might call the return on investment, or ROI) of sprinklering residential properties. What if they could actually save developers (and city planners) money with sprinklers, at the same time making homes safer, and reducing the post-burn cleanup for fire events?



"We were lucky way back in 1984, that we had a council that understood, [home sprinklers] and the long-term benefits of this protection as it related to our growing infrastructure and future efficiencies of the fire service." -Kerry Swick

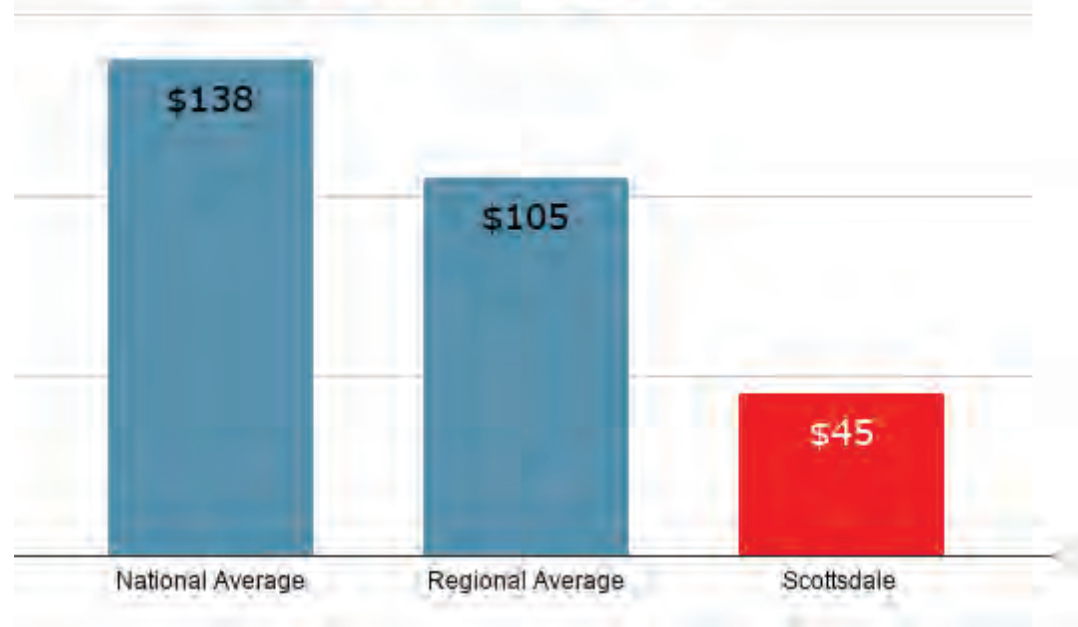
## 2024 SOC Fire Impact Updates



**Typical Risks.** Scottsdale had about as many property fires in the data period as other towns its size. This was "normal," but the fire safety results were not.

## 2024 SOC Fire Impact Updates

### FIRE LOSS PER CAPITA



**Crushing It.** Scottsdale's sprinkler policy reduced property losses in the area by almost 80 Percent.

# A THOUGHTFUL EVOLUTION

To make sprinklers work, fire service leaders have carefully navigated changing codes, testing them in real-world situation, and making the case that their installation saves cities and developers money.

Over the years, best practices for residential sprinklers have occasionally shifted, evolving, for example through several different types of pipe materials, first copper, then polybutylene, and now CPVC and PEX. “Another thing a lot of people don’t know,” Says Swick, “is that residential sprinklers were designed to work a lot differently than commercial ones. The spec-I guess you would call it—was that you would be able to be in the room of origin of a fire and live through it—without even smoke [toxicity].” They were initially designed for life-safety, not property protection.

Swick shares an anecdote about Lou Weitzman, the founder of [Rural Metro](#), who has been a maverick in the fire safety field.

“Sprinklers had been tested in old, dilapidated houses, but Lou had the idea that they should be tried in new modern homes. So he lit the Christmas tree on fire in the living room of the new, sprinklered model house.

“The funny story is that he grabbed Captain Ford at the time,” he continues, “and said, ‘Hey, If this doesn’t work, you put this fire out quickly, because I have to buy the house.’”

The sprinkler did work, of course, and case study data from Scottsdale shows that sprinklers have outperformed expectations. Often, as you’ll read later in this report, a single sprinkler will douse a fire before it becomes a life and property disaster.

Along the way, Swick adds, the fire community has learned how to talk to builders and developers. “We talk about what they care about,” he says, “like maybe they can increase their density allotment for homes with sprinklers. They may not need to have a big water reservoir, or fewer hydrants. It’s about the financial incentives.”

In addition, Swick says, the City was able to reconfigure the assets used in emergency scenarios. With reduced impact on their expensive fire trucks, ladders and gear, they could boost budgets for EMS teams and reduce overall maintenance costs.

# SWEETENING THE SPRINKLER DEAL

- Increased Development Density of 4%
- Increased Fire Hydrant Spacing for Residential Development
- Reduced Water Main Sizes / Fire Flows
- Requirement for 360 Degree Access Removed to Allow for Better Use of Available Property
- Reduced Street Widths
- Increased Cul-de-Sac Lengths
- Non-Rated Residential Structures Allowed  
(This means relaxed fire “hardening” requirements such as fire walls in some cases)



**ROI in Action.** The original sprinkler ordinance, established in 1986 for Scottsdale, presented the change as part of a better “system” that would benefit developers as well as homeowners. This proved accurate. For example, fire hydrant spacing was increased from 600 feet to 1200 feet in fully sprinklered single family home developments. In addition, the required fire flow demand for structures was reduced by 50%, which resulted in a typical one step reduction in water main size. The initial impact on water infrastructure for Scottsdale was projected at \$7.5 million in savings (for the water distribution system).

# PROOF OF CONCEPT

Between 1986 and 2010, Scottsdale’s fire safety record demonstrated not only life-saving results, but also a huge difference in property loss compared to buildings without sprinklers.

<b>Total Working Fires in Sprinkled Buildings</b>	<b>199</b>
<b>Types of Activations</b>	
- Commercial	102
- Multi-Family	48
- Single Family	49
<b>Total Value of Complexes</b>	<b>\$767,334,000</b>
<b>Total Loss at 199 Fire Incidents</b>	<b>\$703,300</b>
<b>Total Lives Saved</b>	<b>13</b>
<b>Average Loss per Incident</b>	<b>\$3,534</b>
<b>Avg Working Fire Loss Non-sprinkler Event</b>	<b>\$39,672</b>
<b>Fires Controlled With 2 or Less Sprinklers (183/16)</b>	<b>92%</b>

**High Marks.** Scottsdale firefighters found that in sprinklered homes, over a 14-year span, they saw almost no loss of life, much less property damage, and in most cases, sprinklers that extinguished fires long before they got out of control inside the home.

# The (Perilous) Modern House

## **Framing Vulnerability.**

New framing materials such as engineered I-joists in attics means firefighters may have less time to safely fight fires from the roof.

## **Synthetic Seating.**

Polymer-based upholstery, often stuffed with polyurethane foam, burns hot and dirty—releasing deadly toxins and black smoke that can quickly overpower occupants sleeping in upstairs bedrooms.

## **Tight Walls That Trap Smoke.**

Energy-efficient construction reduces air leakage, which can limit early smoke dilution and increase internal heat buildup—contributing to more rapid fire development and toxic exposure (U.S. Department of Energy / ASHRAE research).

## **Wide Open Plans.**

An open floorplan means any fire has plenty of oxygen and sends smoke roiling upward, as the whole area “flashes over.” According to the UL Fire Safety Research Institute, estimates, this point happens in 3-5 minutes, versus 15-20 minutes for older, partitioned homes.

## **Other Flammable Stuff.**

Modern homes tend to contain more combustible contents—plastics, electronics and composite materials—leading to faster heat release rates and earlier flashover conditions, says the National Fire Prevention Association.

# SPRINKLER MYTHS AND FACTS



To make sprinklers work, fire service leaders have carefully navigated changing codes, testing them in real-world situation, and making the case that their installation saves cities and developers money.

The real secret to the home fire sprinkler “equation” lies in the details: how they work with building codes and how to install them correctly. Over the years, some of the best practices have “evolved,” but the technology, overall, has proven resilient and sound.

For example, some critics worry about leaks.

“It’s very, very rare that they go off for no reason,” says Swick. It’s typically operator human error that causes a leak. They hit the sprinkler with a soccer ball -- things like that.

It’s something like one in 16 million sprinklers might leak.”

It’s far more likely for piping to be damaged by contractors, he says, than mechanical failure of a sprinkler.

“For example, the air conditioner dudes might go up in the attic and step on one of the cpvc pipes,” he says.

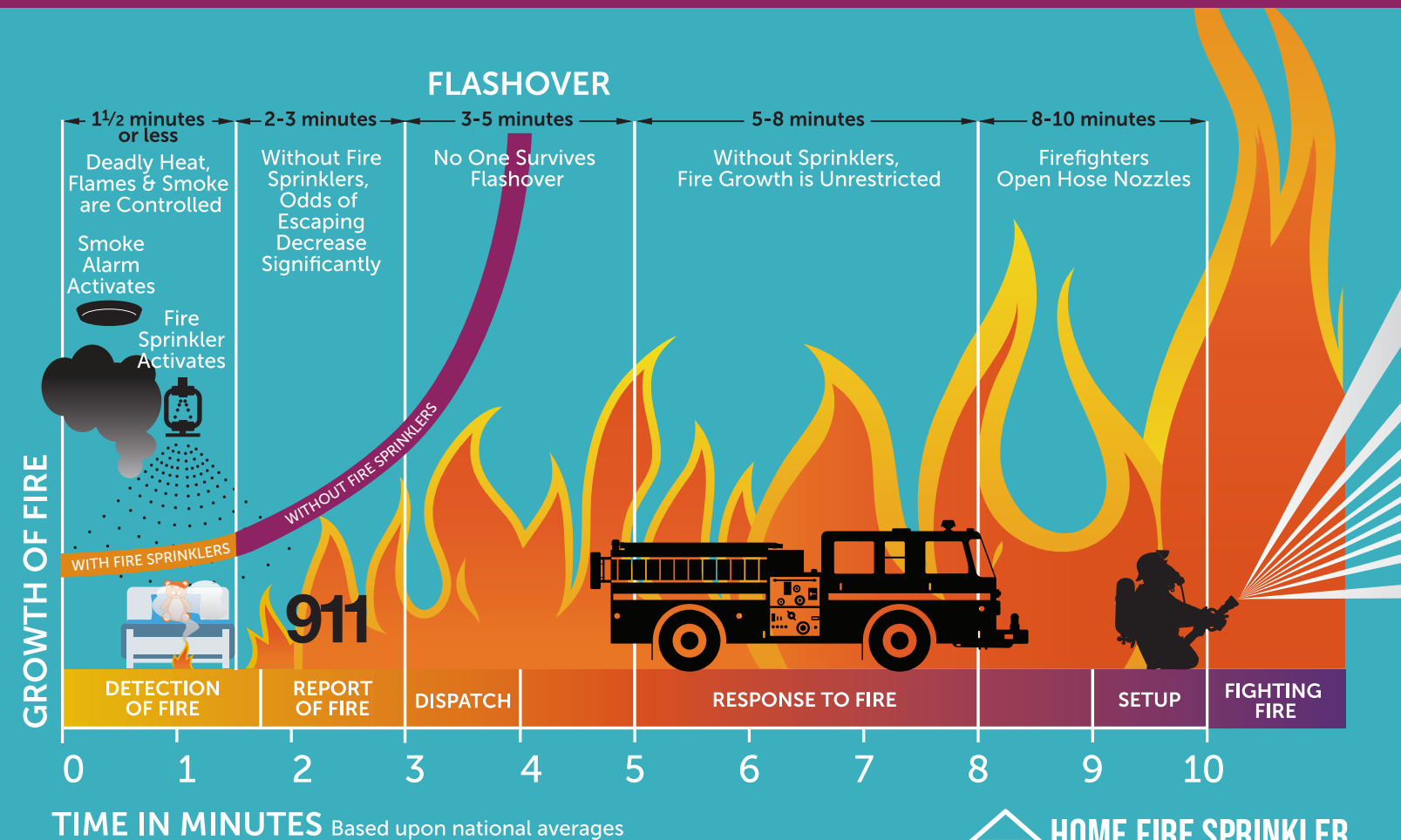
“One thing you have to keep in mind is how sprinklers work,” he says. “Commercial sprinklers go off at about 165 degrees, okay, but it takes them, I want to say, almost like 90 seconds at that temperature. Residential sprinklers go off in 20 seconds at 155 or 160 degrees, so much more quickly.”

This matters, he says, because “the fire is really in its incipient stage right, right before it can get detrimental.” In other words, the fire is typically put out before it gets out of control. Also, sprinkler operate independently, so you don’t damage the whole house by setting off every sprinkler head. Fire sprinklers use about 13 gallons of water per minutes compared to firefighter hoses that use 250 gallons per minute.

# TIME: A LIFE AND DEATH AMENITY

Without sprinklers, the speed and intensity of many home fires means firefighters may not arrive in time to save lives.

## HOME FIRE TIMELINE



# ON THE RECORD

Numerous real-world reports on sprinkler impacts demonstrate the critical role they have played in Scottsdale's fire safety. Here are four residential fires where sprinklers played a decisive role in the outcome.



## CASE IN POINT

**Location:** 25000 N. Horseshoe

**Date:** February 5, 2011

**Fire Type:** Single-family Residential

**Time:** 11:47 p.m.

**Total Loss:** \$20,000 - Total Potential \$419,300

**Cause:** Kitchen Fire

**Total Sprinkler Heads Operated:** One (1)

**Notes:** Fire was out on arrival of fire department. Crews spent only 15 minutes on site with full team, leaving only one truck to monitor the site.



## CASE IN POINT

**Location:** 13000 N. 103rd Place

**Date:** July 1995

**Fire Type:** Single Family Residence

**Alarm Time:** 10:00 a.m.

**Total Loss:** \$1,500 - Potential \$138,000

**Cause:** Arson (flammable liquid)

**Total Sprinkler Heads Activated:** One (1)

**Notes:** One Life Saved. Fire extinguished in bedroom where it was ignited with just one sprinkler.



### **CASE IN POINT**

**Location:** 9600 E. Happy Valley

**Date:** May 1994

**Fire Type:** Single Family Residence

**Time:** 2:11 p.m.

**Total Loss:** \$1,300 - Total Potential \$130,000

**Cause:** Arson (flammable liquid)

**Total Sprinkler Heads Operated:** Two (2)

**Notes:** This home was under construction when it was purposely set on fire, and could have been a total loss, but for the presence of two sprinkler heads.



### **CASE IN POINT**

**Location:** 9400 E. Redfield

**Date:** January 2001

**Fire Type:** Multi-family Residential Complex

**Time:** 3:45 a.m.

**Total Loss:** \$1,500 - Total Potential \$950,000

**Total Living Units:** Building 16/Complex 304

**Cause:** Clothes Iron Mishap

**Total Sprinkler Heads Operated:** One (1)

**Notes:** Despite the fact that the smoke alarm had been disabled, a sprinkler saved the life of the tenant when an iron was left on.

# NORMALIZING SPRINKLERS

Scottsdale's experience with residential sprinklers offers a compelling argument for updating codes that include fire sprinklers or adopting sprinkler ordinances—it's simply a common sense approach to fire safety that benefits all parties.

The level of public knowledge about sprinklers, as Swick points out, however, is still fairly low. He notes that the majority of homeowners never think about sprinklers—until and unless there is a fire.

There's also a lot of misinformation still lurking out there, and opponents who would like to limit sprinkler adoption at the State government level. Builder groups, for example, continue to complain about the installation costs for home sprinklers, arguing that they cost \$5,000 to \$15,000 per home, although these figures do not take into savings with fire-related design freedoms.

In fact, a [ten-year study](#) (see page 21 of the linked pdf) of sprinkler installations arrived at numbers much more modest than these, albeit these were 1996 dollars. The study, based on 11 different local home designs by three developers, considered average single-family home sizes of 2,000 square ft. At that time, total costs added up to \$1.14 per square ft.

Once the researchers factored in the design freedoms that were

included in the ordinance, however, they deducted a per house savings of \$158.52 for on-site construction tradeoffs and an additional \$1,951.55 for off-site adjustments. The total costs of the sprinkler system per house was estimated to be \$157.24 per installation to the builder and approximately \$212.27 to buyers. Assuming all costs rising at about the same rate with inflation, that's equivalent to about \$430.00 in 2026 dollars that would come out of the buyer's pocket.

Even if you set aside the benefits for developers and municipal budgets, perhaps they are asking the wrong questions of their clients, who (they have claimed) don't want to pay for sprinklers: "What is the value of saving a family member's life and all of your belongings, in a house fire?"

It's in the interest of both developers and city officials to make information about sprinklers widely available. One easy way to do that is by tapping into assets available from the [Home Fire Sprinkler Coalition](#).

Kerry Swick knows what he would like his legacy in fire prevention to be: "I don't want to bring [residential sprinklers] to the forefront any more. They should not be a separatist issue. It's just part of your plumbing, right? When your supply line to your toilet breaks, you don't call a building official, you call a plumber. Sprinkler systems should be thought of the same way."



## MULTIFAMILY FIRE EVENTS (SCOTTSDALE, 1986-2010)

Total Fires in Multi-family Sprinkled Buildings	48
Total Potential	\$47,911,000
Total Loss	\$321,990
Average Loss per Sprinkler Incident	\$6,708
*Adjusted Potential	\$46,911,000
Adjusted Loss	\$71,990
Adjusted Avg Loss per Sprinkler Incident	\$1,532

## ACTIVATION HISTORY

1 sprinkler head control	x 41
2 or less sprinkler head control	x 47
3 or more sprinkler head activations	x 1
Fires controlled with two or fewer heads (47/1)	98%

\*Note: One incident, the Joshua Tree Apartment Complex/Omega incurred a \$250,000 loss, despite 7 sprinkler heads putting out the fire and saving lives. This skewed the overall "average" damage figure. The reason? Extensive water damage to some units as the sprinkler water cascaded through the units on various floors.

## EVALUATION OF SPRINKLER IMPACT IN SINGLE-FAMILY HOMES

January 1, 1986 through January 1, 2001

Total Fires in Single-family Sprinkled Buildings	49
Total Potential Loss	\$20,987,000
Total Actual Loss	\$106,110
Average Loss per Sprinkler Incident	\$2,166
Avg. Loss for Non-sprinklered Residential Fires	\$45,019

## ACTIVATION HISTORY

1 sprinkler head control	x 40
2 or less sprinkler head control	x 43
3 or more sprinkler head activations	x 6 (2 arson, 2 appliance, 1 kitchen, 1 garage)
Fires controlled with two or fewer heads (43/6)	88%



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