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BALANCED FIRE PROTECTION
RESIDENTIAL SPRINKLER ORDINANCE
PRINCE GEORGE'S COUNTY, MARYLAND

A paper written by Fire Chief Ronald Jon Siarnicki of the Prince George's County Fire/EMS Department titled "*Residential Sprinklers: One community's experience twelve years after mandatory implementation*" dated January 2001 documents Prince George's County experience with an ordinance which mandated sprinkler protection in all residential occupancies. The following are excerpts from Chief Siarnicki's paper:

> "*Today, the Prince George's County Fire/EMS Department is a career/ volunteer combination system that consists of 47 fire/rescue facilities. Currently, the authorized strength of the career force is 800 employees and a total volunteer force of 2,000, of which about 1,200 participate in emergency response activities. The operating budget for the Department is 67 million dollars, which includes fringe benefit packages for both career and volunteer members. The Department is responsible for all suppression activities, both Advanced Life Support and Basic Life Support delivery systems, and fire prevention and investigation activities (PGFD, 2000).*"

> "*Prince George's County, Maryland, has a population in excess of 830,000 residents who live predominantly in the northern two-thirds of the 500 square miles that make up this land mass.*"

> "*According to the United States Fire Administration, in 1985, 6,000 fire deaths were occurring annually in the United States, and 80% of them had occurred in residential structures, with 50% of those individuals killed being the elderly, handicapped, intoxicated individuals, and children. Fire statistics for Prince George's County, at the time, supported similar findings with an average of 14 fire deaths a year and 104 fire injuries occurring in the County annually. Reporting 89% of the fire deaths occurring in residential properties, and structural fire losses amounting in excess of $13,800,000 annually (Prince George's County Government, 1987).*"

"*In an effort to reduce these staggering statistics and to meet the fire suppression obligations of the government, a plan of action was developed to introduce legislation requiring the installation of residential fire sprinkler systems throughout the County. . . . . the legislation was approved by the Prince George's County Council and signed into law in 1987, by the County Executive. The law allowed for a phase-in of these lifesaving devices. One and two family model homes had to feature sprinkler systems on February 1, 1988. All multi-family residences were affected on June 30, 1988, with all townhouses starting on January 1, 1989. On January 1, 1992, the final stage of the law went into effect stating that from that point on all residential structures, including single-family homes, must be fully protected by a NFPA Approved 13-D residential sprinkler system (PGFD, 1990).*"

"*The first municipality in the United States, 1978, to require residential fire sprinklers in all new properties was San Clemente, California.*"

"*The research of the time, 1978-1987, went on to support that; "Studies by the Federal Emergency Management Agency through the United States Fire Administration indicate that the installation of home quick response fire sprinkler systems could have saved thousands of lives, prevented a large portion of those injuries, and eliminated hundreds of millions of dollars in property losses," as reported in 1986 (USFA). The problem was getting the public to accept this fact and install them.*"

"*Then, one of the most disastrous blows to the efforts of legislating the installation of residential sprinklers occurred. The Omega Fire Sprinkler Head Recall. A national recall of 8.4 million defective sprinkler heads* [sprinklers] *because of the use of a synthetic elastomer O-ring that swelled or degraded to a point that the head would be rendered inoperable (UL, 1996). This defective design feature, which was known to prevent activation of the head* [sprinkler] *when a fire actually did occur, sent a shock wave through the sprinkler community. Providing unwarranted opportunities to spread misinformation by those individuals that wished to refute the importance and significance that residential sprinklers had added to the safety elements of a home. This one single event, in this author's opinion, caused an expressive destructive blow to the positive residential sprinkler efforts by so very many and that the need is again present for a national effort to restart the residential sprinkler installation efforts that were unprecedented in the 1980's.*"

"*The fire problem in Prince George's County is very similar to many other urban/suburban communities in the United States. The leading cause of fire is unattended food on the stove, which accounts for over 26% of all fires reported in the County on an annual basis. In 1999, the Department responded to approximately 110,000 calls for service annually of which 85,000 of those incidents are EMS in nature.*"

"*First and foremost was the need for accurate information and facts concerning other community's experiences with residential sprinklers. It was critical to use facts that were hard to dispute and hit home on making the County safer.*"

"*The predictions that were made 12 years ago were as follows; the cost for having a residential sprinkler system installed in a new home during construction would be approximately $2,500 to $3,500 per dwelling. Installations may be done by a sprinkler contractor, plumber, homeowner, or subcontractor, provided that the system design is in accordance with required code standards. The installation of a residential sprinkler system will in some cases, reduce home insurance premiums. Residential sprinkler heads are not unattractive to the homes aesthetics features, and residential sprinklers will extinguish a typical room fire prior to sufficient accumulations of toxic fire gases or heat development. Most fires will be extinguished by one or two sprinkler heads* [sprinklers]. *Minimal amounts of water will be utilized to extinguish the fire. Minimal amounts of water damage will occur since these heads* [sprinklers] *only utilize 13 gallons of water per minute each. The resale value of your home will increase, and these systems do not experience accidental activations with any regularity (PGFD, 1987).*"

"*Even with these training courses, problems continued to persist. Problems such as shoddy workmanship by system installers and inferior products being used to cut cost corners by builders. Poorly designed systems that did not adequately protect all aspects of the structure and most of all, a general lack of proper insulation techniques that lead to a rash of sprinkler pipe breaks in unheated portions of these structures. It took a few years, but these issues seem to have been mitigated, in most cases, through formal education, sharing of information, and improved inspection services.*"

"*The first search involved all reported incidents in the County involving residential sprinkler activations in fully sprinklered buildings starting on April 21, 1989, through December 31, 1999. These dates were chosen because on April 21, 1989, the first reported sprinkler activation in the County occurred since the implementation of County Council Bill 145-1987 and on December 31, 1999, came an end to a significant point in time that can be referenced easily, the end of a millennium. During this time frame, 121 sprinkler system service calls for release of water were made to the Fire/EMS Department with 117 actual sprinkler activation incidents having been reported in Prince George's County, Maryland. Of these incidents, 143 heads were activated for various reported reasons and those that were the result of an actual fire occurrence, were most often extinguished prior to the arrival of the responding emergency personnel and units. One incident was reported because a ceiling fan was misaligned and struck a head, and three incidents were reported as sprinkler activations, but were actually frozen water pipes that had broken due to poor insulation techniques.*"

"*From this data, one can determine that the average amount of fire loss in sprinklered dwellings is around $3,300.00 per incident and in non-sprinklered structures $80,000.00 per incident. As can be expected though, due to the different types of structures and their relative worth, the amount of loss for non-sprinklered buildings is some what skewed, so the information has been broken down by building type so that a better comparison can be made.*"

"*In 1987, the County was experiencing fire statistics that averaged 14 fire deaths annually of which 89% of the fire deaths occurred in residential properties. In 1984, structural losses due to fire in the County exceeded $10,700,000 and in 1986, structural losses escalated to $13,800,000 of which 8 million dollars in loss were to residential structures alone. The County was averaging 109 serious injuries due to fire on an annual basis, as well.*"

"*From 1987 to 2000, Prince George's County, Maryland, has seen both boom and bust in its economic development and residential construction experiences. However, constant throughout this time has been the requirement that any new home, no matter what the occupancy, be constructed with a full automatic residential sprinkler system so as to deal with the potential of fire occurrence in the home. During this time frame, nearly 30,000 residential fire sprinkler systems have been installed in Prince George's County, Maryland (Department of Environmental Resources, 2000).*"

"*It is now a proven fact, through the Prince George's County experience, that in all 117 fire related cases, as part of this research, the buildup and accumulation of toxic fire gases and heat was prevented by the activation of either one or two residential sprinkler heads. This is supported by the fact that no one individual, out of the 154 that were present at the time of these reported fire occurrences or seven that were injured in these 117 fire cases, was overcome by smoke or, more tragically, succumbed to the devastating effects of the fire. Compared to the obvious number of injuries, both smoke inhalation and burns that resulted to the group of citizens that resided in non-sprinklered structures, 22 reported deaths and 46 significant burns and smoke related injuries that occurred in just four short years.*"

"*In all of the 121 incidents that were reported in the eight years of data collected, only 11 of them reported more than one head activated. Of those 11, seven had more than two heads activated. A review of those seven cases revealed that some type of extenuating circumstance, such as the use of an accelerant or human intervention, contributed directly to the involvement of the other sprinkler heads, and only four cases reported some type of accidental activation or water flow from reasons other than a fire occurrence.*"

"*At the time that this legislation was adopted, the expected cost for installation of such a residential sprinkler system was estimated to be approximately $1.50 per square foot. Today, in new construction, the cost does vary according to the specific geographical area the home is being built in, due mostly to the specific code being enforced in that area, but averages are still between $1.00 to $1.50 per square foot (Wilk, 1999). Very similar to, but slightly less than the costs that were identified 12 years ago.*"

"*Current cost estimates for retrofitting an average single-family dwelling is between $2.00 and $4.00 per square foot (Zimmerman and Hopkins, 1998). . . . .The long-term benefits, relative to life and property savings would far outweigh the $2.00 to $4.00 per square foot cost that would have to be expended.*"

"*Probably one of the most influential documents ever published in this country concerning our national fire problem was "America Burning." This report of the National Commission on Fire Prevention and Control (1973) identified 90 recommendations that would assist America in becoming more fire safe than it was in the early 70's. . . . . And in 1999, a third panel of "America Burning" was recommissioned to look at the overall success of the original report from its inception. . . . This new report entitled "America at Risk" assessed the progress made to date on the original 90 recommendations of the first report and identified 12 new and specific findings that need to be addressed at the national level to reduce death, injury, and property loss in this country (USFA, 2000).*"

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