In the Matter of the Application Nos. A.04-04-040;
A.04-04-041; and A.04-08-013
(California Public Utilities Commission)
Hearing Date: 12/06/04

I. INTRODUCTION:

My name is Stephen D. Hart. I am currently a consultant with the National Automatic Sprinkler Industry Promotion (NASIP), which is administered through the National Fire Sprinkler Association (NFSA), Patterson, NY. I work out of my home, located at 1050 Eileen Way, Sacramento, CA 95831-5812. My business telephone number is (916) 392-9011. My E-mail address is hart@nfsa.org. I have held that position since July 1, 1999.

My prior employment history would reflect; Fire Marshal with the City of Foster City F/D (06/97 to 02/99), Deputy Director (Deputy Chief) for the Office of the State Fire Marshal (09/95 to 06/97), Director with the Fire Sprinkler Advisory Board of Southern California (FSABSC) at the Boards Offices in Cerritos, CA (07/88 to 09/95), Fire Marshal with the City of Monterey F/D (05/77 to 06/88), Building Official/Fire Marshal with the City of Marina F/D (01/75 to 05/77), County of Monterey Building Department (05/72 to 01/75), and City of Monterey Public Works Department (12/65 to 05/72)

During my nearly 40-year career, both in the public sector (City, County, Special District, and State Governments) and in the private sector (FSABSC and now with the NAS-IP) I have worked closely with the construction industry throughout California, and with many different water purveyors, including California American Water Company (who was the water purveyor for the City of Monterey).

In 1982/83 while holding the position of Fire Marshal with the City of Monterey I helped to develop what has been commonly referred to as the "Water System Improvement Fund" (WSIF) which was first adopted by the City Council of Monterey on August 2, 1983. The purpose of this fund was to cause the upgrade to the fire hydrants and water system supply mains throughout the City of Monterey at the direction of the Monterey F/D, with funding (fees) collected based on fire-flow demand of new construction projects, and those building owners paying a proportionate share of the total cost for improvements.

Since the WSIF Ordinance passage in 1983, several million dollars have been collected by the City and directed to California American Water Company for improvements to the water mains and fire hydrants.

Question: Why is the WSIF Ordinance being presented in this introduction?

Answer: Because, the WSIF Ordinance gave considerable credit (in the form of fire-flow demand and factor [fees]) associated with new construction and additions /repairs to existing structures which were to be protected with

automatic fire sprinklers. The value of "built-in fire-protection" was known in 1983 as it is today (2004) and was identified more than 135-years ago when this technology was first invented.

II. BACKGROUND:

According to a September 2003 Report "Fire Loss in the United States During 2002" prepared by Michael J. Karter, Jr., Fire Analysis & Research Division of the National Fire Protection Association (NFPA):

- 1,687,500 fires were attended by public fire departments,
- 519,000 fires occurred in structures,
- 401,000 fires or 77% of all structure fires occurred in residential properties,
- 329,500 fires occurred in vehicles,
- 839,000 fires occurred in outside properties.

What do these fire frequencies mean? Every 19-seconds, a fire department responds to a fire somewhere in this nation. A fire occurs in a structure at the rate of one every 61-seconds, and in particular a residential fire occurs every 79-seconds. Fires occur in vehicles at the rate of 1 every 96-seconds, and there's a fire in outside properties every 38-seconds.

Civilian Fire Deaths:

- 3,380 civilian fire deaths occurred in 2002,
- About 79% of all fire deaths occurred in the home,
- 2,670 civilian fire deaths occurred in the home,
- Nationwide, there was a civilian fire death every 156-minutes.

Civilian Fire Injuries:

- 18,425 civilian fire injuries occurred in 2002,
- 14,050 of all civilian injuries occurred in residential properties, while 1,550 occurred in nonresidential structure fires,
- Nationwide, there was a civilian fire injury every 28-minutes.

Property Damage:

- An estimated $10,337,000,000 in property damage occurred as a result of fire in 2002,
- $8,742,000,000 of property damage occurred in structure fires,
- $6,055,000,000 of property loss occurred in residential properties.

Intentionally Set Fires:

- An estimated 44,500 intentionally set structure fires occurred in 2002,
- Intentionally set fires in structures resulted in 350 civilian deaths,
- Intentionally set structure fires also resulted in $919,000,000 in property loss.

III. REDUCING THE LOSS RESULTING FROM RESIDENTIAL FIRES:

While heat-actuated fire sprinklers as we know them today were first conceived in 1860, it was not until 1896 when the first edition of what is now NFPA 13 – *Standard for the Installation of Sprinkler Systems* was published. Publication of an installation standard led not only to uniformity in system installation criteria, but more importantly to reliable system performance in the control and extinguishment of fires. For the past hundred years, automatic fire sprinklers have been increasingly utilized in manufacturing, warehouse, mercantile, and commercial buildings.

The concept of putting fire sprinklers in dwellings was first publicly promoted in the 1930's by the Grinnell Company and was referred to as the "Junior" automatic sprinkler system, but the systems were not widely installed. It was advertised as "*A Revolutionary New Development for Residential Protection*".

In March of 1968 the United States Congress passed Public Law 90-259 – The Fire Research and Safety Act of 1968 that, among other elements, authorized "*research into the causes and nature of fires, and the development of improved methods and techniques for fire prevention, fire control, and reduction of death, personal injury, and property damage*" (Title-1 of Public Law 90-259). In addition, the National Commission on Fire Prevention and Control was created and directed "*to undertake a comprehensive study and investigation to determine practicable and effective measures for reducing the destructive effects of fire throughout the country*". (Title-II of Public Law 90-259)

On May 4, 1973, the National Commission on Fire Prevention and Control issued its comprehensive report "**AMERICA BURNING**", which outlined the nation's fire problem, fire prevention efforts, and programs for the future. This report pointed out that almost seven of every ten fires occurred in residential occupancies (based on 1971 NFPA data). Additionally, it was noted that eighty-seven percent (87%) of the fire deaths in building fires occurred in residential occupancies (page 54).

In its report, the Commission recommended "*the proposed U.S. Fire Administration support the development of the necessary technology for improved automatic extinguishing systems that would find ready acceptance by Americans in all kinds of dwelling units*" (page 120).

Also in 1973, a subcommittee of the NFPA Committee on Automatic Sprinklers was formed to prepare a standard for the installation of sprinkler systems in dwellings. Such a standard, utilizing commercial sprinklers with a reduced water supply, was adopted and published in 1975 as NFPA 13D – *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes*.

In 1976 the U.S. Fire Administration (USFA), then known as the National Fire Prevention and Control Administration (NFPCA), began to fund research programs focusing on the residential fire problem in general, and residential fire sprinkler

protection in particular, in the hope of optimizing fire sprinkler devices for residential dwelling use with the dual goals of improved performance and low cost.

As a result of multiple research studies and full-scale fire tests, NFPA 13D was rewritten and published in 1980, incorporating the residential test results and requiring, for the first time, the use of fast response residential sprinklers.

Subsequent editions of NFPA 13D in 1984, 1989, 1991, 1994, 1996, 1999 and 2002 have resulted in changes to the rules relating to design and installation of these dwelling systems while maintaining the same basic purpose: "*To prevent flashover in the room of fire origin, when sprinklered, and to improve the chance for occupants to escape or be evacuated.*"

The combination of the America Burning report and the new fire sprinkler technology led specific local communities throughout the country to begin to mandate the installation of automatic fire sprinklers in residential occupancies. These local initiatives tended to take place on both the west coast and east coast in areas like San Clemente, California, Cobb County, Georgia, Greenburgh, New York, Orange County, Florida, Anaheim, California, Scottsdale, Arizona, Prince George's County, Maryland, and Napa, California.

Over the past thirty years, the growing awareness of the effectiveness of residential sprinkler protection can be considered a major shift in philosophy in the fire protection community. A study conducted by the Fire Sprinkler Advisory Board of Southern California (FSABSC) in 1993 identified eight-four (84) local communities that had adopted a mandate (ordinance) that "all newly constructed single-family dwellings have a residential automatic fire sprinkler system installed". Hundreds of thousands of homes have been sprinklered as a result of the local requirements.

In the summer of 1999, the Director of the Federal Emergency Management Agency (FEMA) formally recommissioned a Blue Ribbon Panel of experts to assess the progress on the issues raised in the America Burning report created more than a quarter century earlier. The panel of experts developed an updated report entitled "**AMERICA BURNING RECOMMISSIONED – AMERICA AT RISK**" which formulated its conclusions in the form of Findings and Recommendations. The report was issued in May of 2000, with a publication date of October 2000.

Finding No. 2 of this Report states (Introduction p. 17-18):

"***The Application and Use of Sprinkler Technology.***

The most effective fire loss prevention and reduction measure with respect to both life and property is the installation and maintenance of fire sprinklers. If the focus is limited to prevention and reduction of the loss of life, smoke alarms are also extremely effective. However, the use of sprinklers and smoke detectors has not been sufficiently comprehensive.

Recommendations:

FEMA/USFA should develop a long-term implementation strategy for fire sprinklers and smoke alarms. The plan should include the following implementation aspects:

- *The approach should be community based;*
- *No tactic or strategy should detract from the requirement for sprinklers. Smoke alarms (or other measures) should always be the locality's second option as a loss reduction measure;*
- *Exploration of the technical, economic and practical aspects of utilizing alarm and sprinkler systems that provide automatic notification to a firehouse. These systems should be professionally maintained and monitored;*
- *Confirmation of the accuracy of the belief that the appropriateness of the emplacement of sprinklers and alarms may be based on rural and urban distinctions, and whether other distinctions such as residential construction, commercial construction and critical facilities may also be appropriate;*
- *The plan should distinguish between requirements for new construction and existing construction.*"

IV. BENEFITS OF RESIDENTIAL FIRE SPRINKLER SYSTEMS:

On Sunday (November 14, 2004 from 10:15 a.m. to 12:00 p.m.) a program entitled "A Cost/Benefit Analysis for Fire Sprinkler Systems in One- and Two-Family Dwellings" will be presented by Assistant Vice President of Engineering Kenneth E. Isman, P.E. (NFSA) at the NFPA Fall Education Conference being held at The Fontainebleau Hilton in Miami Beach, Florida.

The Study will show that over a 50-year period, that a home (with the residential fire sprinkler system) a cost benefit to the community and the homeowner will have been significant. While this study can not be distributed until after the November 14th presentation, it is noted that elements of this comprehensive study will include; Years (1 thru 50), Number of Sprinklered Homes, Total Number of Homes, Number of Fires in Sprinklered Homes, Number of Fires in Unsprinklered Homes, Number of Lives Saved, Number of Injuries Prevented, Value of Lives Saved, Value of Injuries, Value of Property Saved, Value of Indirect Savings, Value of Insurance Savings, Value of Construction Savings, Value of Fire Department (firefighters and equipment) On Scene, Value of Fire Department Planning, Income Tax Savings, Savings of Sprinklers, Cost of Sprinkler Systems, Net Costs, and Cumulative Net Costs

Additionally, the American Water Works Association (AWWA) has studied the relationship of automatic fire sprinkler systems and the water distribution system associated with these fire protection systems and outlines their findings in the AWWA (M-31) Manual of Water Supply Practices – Distribution System Requirements for Fire Protection first published in 1989.

Chapter 5 (beginning on page 38) states:

Automatic Fire Sprinkler Systems.

"Automatic Sprinklers have been the most important single system for automatic control of hostile fires in buildings for more than a century. . . Among the benefits of automatic sprinklers is the fact that they operate directly over a fire. Smoke, toxic gases and reduced visibility do not affect their operation. In addition, much less water is used because only those sprinklers fused by the heat of the fire operate, especially if the building is compartmented."

"The above statement points out the fact that of all the tools available to facilitate and promote fire protection, none offers such a wide variety of benefits to the building owner, developer, fire service, water purveyor, and the general public as does the widespread use of automatic sprinkler systems."

"In this charter (Chapter 5 – pages 38 thru 47) several factors related to the use of automatic sprinkler systems will be discussed, including their effect on required fire flows, development costs, demand on the fire service, the water purveyor, and the public at large. Finally, some initiatives that might be considered in an attempt to encourage sprinkler use will be discussed."

The City of Scottsdale, Arizona has been unique opportunity to study a rapidly growing community, and utilizing the fire sprinkler technology for both commercial and residential construction. In July of 1985 the City of Scottsdale passed Ordinance #1709, which, when the city finally reaches its full growth potential, it is estimated that it will be a community with over 300,000 residents and more than 65% of the residential homes and 85% of the commercial property will be protected by automatic fire sprinkler systems.

The impact and installation costs have been reduced dramatically, from $1.14 per square foot to $0.59 per square foot. The average fire loss per sprinklered incident was only $1,945, compared to a non-sprinklered loss of $17,067. According to the Automatic Sprinklers – A 10 Year Study (A detailed history of the effects of the automatic sprinkler code in Scottsdale, Arizona (1997 – by Assistant Chief Jim Ford – Rural/Metro Fire Department, Scottsdale, Arizona) "Automatic protection had a direct role in saving eight (8) lives. Additionally, the study reflected that one or two fire sprinklers controlled or extinguished the fire 92% of the time, with the majority of the exceptions a result of flammable liquid fire incidents.

These statistics taken from the Scottsdale AZ 10-year Study are not unusual. Over the years there have been several national/international studies of fire sprinkler performance with the following statistical results:

Study	Successful Performance
• Australia and New Zealand (1886-1988; 9,022 fires)	99.4%
• New York City High-Rise (1968-1978; 1,648 fires)	98.4%
• New York City Low-Rise (1969-1978; 4,061 fires)	95.8%
• National Fire Protection Assoc. (1925-1969; 81,425 fires)	96.2%
• US Navy (shore facilities) (1964-1977; 724 fires)	95.7%
• Factory Mutual Research (1970-1977; 3,292 fires)	86.1%
• Oregon State Fire Marshal (1970-1978; 1,648 fires)	85.8%

There are two (2) concepts, which must be recognized and understood:

Reactive Fire Protection:

- *Traditional fire service organizations; where a problem has occurred before it is addressed with passive building codes and the hope that the fire department resources that have been amassed, will be able to beat the clock and arrive soon enough to have a positive impact on the emergency incident.*

Proactive Fire Protection:

- *This philosophy is accomplished by embracing new, proven technology, and built-in protection, like automatic sprinkler and early warning detection systems, combined with an aggressive code enforcement and strong public education program.*
  (International Association of Fire Chiefs – IAFC, Operation Life Safety – OLS)

V. PROMOTING THE INSTALLATION OF RESIDENTIAL FIRE SPRINKLER SYSTEMS:

The International Association of Fire Chiefs (IAFC) has partnered with the National Fire Sprinkler Association (NFSA) in the release and dissemination of the "Residential Fire Sprinklers… A Step-by-Step Approach for Communities", which I co-authored with Director of Public Fire Protection Jim Dalton in December 2003. This Guide is available from either the NFSA website – www.nfsa.org and/or the IAFC website – www.iafc.org as a PDF (file) and can be downloaded at no cost. This Guide encourages a "Team Approach" to serving the customer/public and outlines the considerations, which should be developed, including working with the various Water Purveyors.

In the opening page of the Guide, Fire Chief Randy R. Bruegman, (former) President of the IAFC states:

"America cannot continue to suffer the inexcusable high number of fire deaths that occur annually in one- and two-family dwellings. There is a solution! Fire protection experts nationally agree that a significant increase in the installation of residential fire sprinkler systems in homes can cut these deaths drastically."

"We must stop constructing our future housing stock without adequate fire protection. Families should have an expectation of adequate fire protection just as they have expectations of other amenities that are commonplace in a new home."

In a similar manner, the California Fire Chiefs Association (CFCA) on September 20, 2004 approved and adopted a Resolution which outlined the national fire statistics as provided by the NFPA, promotion of proactive residential fire sprinkler systems, identified water savings, and generally endorsed the installation of residential fire sprinkler systems as a cost-effective solution/approach.

The CFCA Resolution further stated:

"To ensure reliability and reduce the cost of a Residential Fire Sprinkler System, installed in accordance with National Fire Protection Association Standards 13R and 13D, a single water meter serving both domestic and the Residential Fire Sprinkler System should be permitted and encourage. Additional fees should not be charged to contractors, developers or homeowners as a result of an increase in a water meter size for the purposes of supplying a Residential Fire Sprinkler System. To limit the cost impact on homeowners, "stand-by" fees for water supply services should not be charged against Residential Fire Sprinkler Systems. To protect the potable water supply, adequate backflow protection, as recommended by National Fire Protection Association Standards 13R and 13D, should be provided."

VI. INCENTIVES FOR THE INSTALLATION OF RESIDENTIAL FIRE SPRINKLER SYSTEMS:

In 1995 the California State Fire Marshal the CSFM's Automatic Sprinkler Systems Advisory Committee – Ad-Hoc Working Group developed a document entitled "Design Alternatives Relevant to One- and Two-Family Residential Fire Sprinklers – Dated May 1995. *"The purpose of these guidelines was to encourage the installation of residential fire sprinklers in a cost-effective manner, thus providing an improved level of protection to the occupant(s), community, and firefighter(s)."*

Within the body of this twenty-two (22) page document was two (2) sections dealing with Water Purveyor Alternatives and Up-Date on Cross-Connection Control requirements (found on pages 13 thru 22). These two sections of the document covered the following issues:

Water Purveyor Alternatives:

- Connection Charge
- Monthly Base-Rate Charge
- Fire Service Standby Charge
- Water Meter Sizing
- Backflow Protection
- Water System Improvement Funds (WSIF)
- Dual-Meter Service Connection

Up-Date on Cross-Connection Control Requirements:

- Letter from State Fire Marshal and Director of Department of Health Services

It should be pointed out that the basis (scope) for these incentives outlined in the Guidelines was not to reduce the level of fire and life safety, but rather to encourage alternatives (incentives) and to not restrict the use of new technologies or alternate arrangements, provided the level of safety prescribed by the applicable installation standard is not lowered.

It must be pointed out that when discussing residential fire sprinkler systems for One- and Two-Family Dwellings, the nationally recognized standard is NFPA-13D – Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes. The State of California has adopted the 1999 Edition of NFPA-13 within the listing of Standards listed in the 2001 California Building Code (Chapter 9, Section 904.1.2 – Page 1-94) and 2001 California Fire Code (Article 91, Section 9101.1.3 – Page 1-275).

The purpose of NFPA-13D is clearly defined in Chapter 1, Section 1-2 (Page 13D-5) as being *"to provide a sprinkler system that aids in the detection and control of residential fires and thus provides improved protection against injury, life loss, and property damage. A sprinkler system designed and installed in accordance with this standard is expected to prevent flashover (total involvement) in the room of fire origin, where sprinklered, and to improve the chance for occupants to escape or be evacuated."*

The design criteria for a residential fire sprinkler installed in accordance with NFPA-13D (1999 Edition) is much different than that for a commercial type sprinkler system designed and installed in accordance with NFPA-13 – Standard for the Installation of sprinkler Systems (1999 Edition). The typical "commercial fire sprinkler system) is designed for the fire sprinklers in the most remote/demanding 1,500 or 3,000 square feet to be designed to be flowing simultaneously (which could be anywhere from four to 10 or more fire sprinklers in a commercial application.

In accordance with NFPA-13D, Chapter 4, Section 4.1.1 (Page 13D-9) the design criteria states:

"Design Discharge. The system shall provide a discharge of not less than 18-gpm to a single operating sprinkler and not less than 13-gpm per sprinkler to the number of design sprinklers, but the discharge shall not be less than the listing of the sprinkler. The minimum operating pressure of any residential sprinkler shall be 7 psi."

The criteria further states, in NFPA-13D, Chapter 4, Section 4-1.2.1 (Page 13D-10):

"The number of design sprinklers shall include all sprinklers within a compartment up to a maximum of two sprinklers under a flat, smooth, horizontal ceiling. For compartments containing two or more sprinklers, calculations shall be provided to verify the single operating sprinkler criteria and the multiple (two) operating sprinkler criteria."

VII. PROPOSAL:

STANDARD METER SIZING:

In the interest of water conservation, and recognizing that a typical 5-8-inch water meter will meet the domestic demands for most homes, a standard 5/8-inch water meter should be adopted as the Standard Size Meter for a Single-Family Dwelling Unit. When the domestic water demand exceed those flows available with a 5/8-inch water meter, based on size of the home or fixture count, then a larger size meter would seem appropriate.

ESTIMATED SUPPLY DEMANDS:

Whenever a Residential Fire Sprinkler System is installed in a One- or Two-Family Dwelling Unit, either by local mandate (ordinance) or voluntarily by the owner/occupant, the water supply shall be determined by calculations in accordance with NFPA-13D (Chapter 2 – Page 13D-6 and Chapter 4, Page 13D-9).

Residence without a residential fire sprinkler system shall be determined by the criteria outlined in Chapter 6 and Appendix "A" of the Uniform Plumbing Code/California Plumbing Code, published by the International Association of Plumbing and Mechanical Officials (IAPMO).

METER SIZE SELECTION:

The size meter necessary to meet the calculated water supply demand for either the domestic or residential fire sprinkler system, and when necessary to reduce the combined demand, an automatic domestic shutoff valve or solenoid valve which would shut off the domestic water supply in the event of a fire sprinkler activation.

As an incentive to encourage the installation of residential fire sprinkler systems, water purveyors should be encouraged to allow (without charge) for the increase of at least one and preferably two meter sizes to allow for adequate fire sprinkler and domestic demands where necessary. Typically an increase of one or two meter sizes are adequate to meet these demands.

METER CHARGE BASIS:

Charging a homeowner a standby meter charge based on the fact that the residence is equipped with a residential fire sprinkler system is like penalizing someone for being water conservation minded. Automatic fire sprinklers (whether residential of commercial) have proven time and time again that fire sprinklers take less water to control and/or extinguish a fire then do fires, which must be extinguished by the manual approach of firefighters, hose, and

equipment.

The typical residential fire sprinkler flows anywhere from 13-gpm to as much as 28-gpm and as such would flow somewhere between 130- to 280-gallons over a 10-minute duration. A firefighter will typically use a 1-1/2" to 2-1/2" fire hose and thus flow anywhere from 100-gpm to 250-gpm, which is used over that same 10-minutes would result in 1,000- to 2,500-gallons.

One other point to consider is that if a Residential Fire Sprinkler System protects the home, the fire would be attacked within the first few minutes of the fire; however, the traditional fire department response will require:

- Detection of the Fire
- Reporting the Fire
- Dispatching the Fire Department (Firefighters/Equipment)
- Response to the Fire Scene
- Setting up of the Fire Equipment (Hose Lines, Equipment, Firefighters)
- Initiate the Fighting of the Fire

MONTHLY SERVICE CHARGE:

Whenever a "residential customer" (One- and Two-Family Dwelling Unit) is mandated by policy (ordinance) or volunteers to install a Residential Fire Sprinkler System (per NFPA-13D) at their place of residence, the monthly service charge would be calculated based on the meter size that would have been deemed necessary for the ordinary domestic service to their residence. In addition to that service charge for the smaller meter, the customer could be charged an upsize charge of $1.35 per ¼". This minimal increase would be a nominal fee for each ¼" increase in meter size to cover return on investment, depreciation, and maintenance on the meter.

It should also be noted that as Residential Fire Sprinkler Systems become more of the "standard installation practice" that these surcharge fees ($1.35 per ¼") could be reduced to a single set rate of $1.35 per installation and/or eliminated all together. This of course can only take place as more and more Residential Fire Sprinkler Systems are installed in our residence.

A Residential Fire Sprinkler System, whether installed because of a local mandate (ordinance) or because the homeowner desires to protect his family, should be given the same economic benefits in regard to the monthly service charge, recognizing that both the mandated and voluntary Residential Fire Sprinkler Systems are installed in accordance with the nationally recognized standard (NFPA-13D).

LOW PRESSURE AREAS:

In areas where the available minimum daily service pressure falls below that pressure permitted by Chapter 6 and Appendix "A" of the Uniform Plumbing Code/California Plumbing Code, published by the International Association of Plumbing and Mechanical Officials (IAPMO).

When the available minimum daily service pressure and/or flows cannot be met for the Residential Fire Sprinkler System, alternatives as outlined in NFPA-13D, Chapter 2, Section 2.2 (Page 13D-6) must be met, which may include:

- An elevated storage tank with a minimum quantity equal to the water demand rate times 10-minutes.
- A pressure tank designed to American Society of Mechanical Engineers (ASME) standards for a pressure vessel with a reliable pressure source.
- A stored water source with an automatic operating pump.

APPLICATION:

These provisions should apply to "ALL" Residential Fire Sprinkler Systems, whether installed by local mandate (ordinance) or voluntary. The purpose of this proposal is to promote the use of and installation of Residential Fire Sprinkler Systems by minimizing any additional costs to the general public and/or the customer(s).

IX. OTHER SUPPORTING DOCUMENTATION:

1) Copy of CFCA Resolution in support of Residential Fire Sprinkler Systems dated September 20, 2004.

2) Copy of California State Fire Marshal – Design Alternatives Relevant to One- and Two-Family Residential Fire Sprinklers dated May 1995 (Pages 13-22).

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Respectfully Prepared and Submitted,

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National Automatic Sprinkler – Industry Promotion