FIFTH DRAFT-12/10/09

THE 2009 REPORT OF THE ONE AND TWO FAMILY RESIDENTIAL SPRINKLER COMMITTEE – A TASK GROUP OF THE BOARD OF BUILDING REGULATIONS AND STANDARDS

(A FOLLOW-ON TO THE "REPORT OF THE ONE AND TWO FAMILY DWELLING FACT FINDING COMMITTEE RELATIVE TO CODE CHANGE PROPOSAL NUMBER 7-94-2" hereafter referred to as the "1995 Report")

INTRODUCTION:

At the May 2007 Public Hearing addressing proposed adoption of the 7th Edition Building Code, the State Fire Marshal and others provided testimony recommending incorporation of residential sprinklers in all new construction one- and two-family homes and as such requirement was not a requirement of the 7th Edition Building Code, recommended that a Task Force be assembled to study such recommendation and report back findings to the Board of Building Regulations and Standards (BBRS).

The BBRS, consequently established the ONE AND TWO FAMILY RESIDENTIAL SPRINKLER COMMITTEE (OTFRSC) and generally utilized as a guide, the Committee make-up of the 1995 ONE AND TWO FAMILY DWELLING FACT FINDING COMMITTEE (the "1995 Report") but additionally included a Registered Architect, thus the make up of the OTFRSC membership is:

- A Member of the Board of Building Regulations and Standards as a member and also as chairman of the OTFRSC
- A Representative of the State Fire Marshal
- A Massachusetts-Registered Architect
- A Head of a Fire Department
- A Building Commissioner
- A Home Builder Association Representative

Between May, 2007 and December 2007, the BBRS sought nominations from appropriate groups and at its February, 2008 monthly meeting, the Chairman appointed the following members to the OTFRSC:

- Robert Anderson, Member of the BBRS and OTFRSC Chairman (Thomas Riley, DPS/BBRS staff as Designee)

- State Fire Marshal Stephen Coan (Designees Timothee Rodrique or Jacob Nunnemacher or other)
- William Christopher AIA, Mass-registered Architect (Alexander MacLeod as Designee)
- Chief George Baker Town of Mashpee (Chief David Jardin, Town of Stoughton, as Designee)
- Matthias Mulvey, Building Official (Gary Moccia or Brian Gale as Designees)
- Stephen Dixon, Home Builders (Harry Smith as Designee)

A number of interested parties (Friends of the OTFRSC) were, from time-to time, present at OTFRSC meetings and provided additional insights. These individuals included representatives from: the National Fire Protection Association, the Home Insurance Industry, the Board of State Examiners of Plumbers and Gas-fitters, the Bureau of Pipefitter, Refrigeration Technicians, and Sprinklerfitters, the International Code Council, a member from the Massachusetts Water Works Association, a representative from the National Fire Sprinkler Association, fire protection engineers and designers, Licensed Sprinklerfitters, Fire Service personnel, Building Officials and fire sprinkler equipment personnel.

MISSION:

The OTFRSC was tasked with identifying the needs for and the impediments to residential sprinklering of all new construction one- and two-family stand-alone dwellings and to identify, in report form, such findings to the BBRS (the OTFRSC is also, however, free to make recommendations regarding residential fire sprinkler issues).

The OTFRSC investigated the following areas – details are presented in Section III of this Report:

1. Fire History and Statistics in One- and Two-Family Dwellings in Massachusetts, including the use of the Massachusetts Fire Incident Reporting System (MFIRS) data and expansion of such information through an additional Survey; "BUILDINGS – FIRE FATALITIES SURVEY (1-6-09)", issued by the OTFRSC.

2. Costs associated with the design and installation of sprinkler systems in one- and two-family stand-alone dwellings, including costs associated with "multi-purpose piping systems", dedicated fire sprinkler systems and fire sprinkler systems operating from pump and tank or from pressurized tank.

3. System maintenance and testing issues.

4. Labor issues revolving around the installation of fire sprinkler systems.

5. Potable water supply issues including first costs, maintenance/testing costs and technical backflow prevention – to assist in these queries the OTFRSC developed and issued a "SURVEY OF PRACTICES RELATIVE TO THE INSTALLATION OF ONE- AND TWO-FAMILY RESIDENTIAL FIRE SPRINKLERS"

6. Building Code, Fire Code and Other regulatory enforcement issues.

7. Home Shut Down Issue

8. The Home Insurance View

9. Existing Buildings

10. Housing Market Impacts

This report serves to document the factual findings of the OTFRSC relative to the ten (10) subject areas identified in the MISSION section above.

Although the committee was established as a fact-finding committee, individual committee members and/or the committee itself are/is also free to present recommendations, thus this Report presents findings as well as certain recommendations relative to the proposal of requiring residential fire sprinklers in new construction one- and two-family, standalone dwellings.

I Overview[1] of NFPA 13D

Referencing the Scope and Purpose of the present 2007 edition[2] of NFPA 13D, this subject Standard covers the design and installation of automatic sprinkler systems for protection against fire hazards in one- and two-family dwellings and manufactured homes.

The purpose of the Standard is to provide a sprinkler system that aids in the detection and control of residential fires and provides improved protection against injury, life loss, and property damage. Sprinkler systems designed and installed in accordance with this standard are expected to prevent flashover in the room of fire origin and to improve the chance for occupants to escape or be evacuated – it is understood that NFPA 13D is a life safety standard and does not provide the near total sprinkler coverage necessary for this Standard to also be considered a true property protection fire sprinkler standard in the way that NFPA 13 is a property protection fire sprinkler standard.

[1] ***Excerpts used with permission of NFPA for use in this report only.***

II –NFPA 13D Fire Sprinkler Design Options

NFPA 13D recognizes the following designs:

- Multi-purpose piping system (if selected/allowed will require a common, single main from the street or from the well and allows for a shared potable water and fire sprinkler water system in the dwelling).
- Independent fire sprinkler system w/1 common main sharing w/potable system (if selected/allowed will require a common, single main from the street or from the well).
- Independent fire sprinkler system w/both a fire sprinkler main and a potable water main (if selected/required locally, will require a separate fire main from the street or from the well).
- Tank and pump (no continuous external water supply but the ability to refill or not refill the tank).
- Pressurized Tank (no continuous external water supply but the ability to refill or not refill the tank).
- A well and pump of sufficient capacity to meet the sprinkler system demand.

III-FINDINGS

III-1 Fire History and Statistics in Massachusetts

Utilizing information acquired from the Massachusetts Fire Incident Reporting System (MFIRS) and a follow-on "**BUILDINGS** – FATAL FIRE SURVEY" issued by the OTFRSC, the following is presented:

EXCERPTED FROM A MASSACHUSETTS 1-& 2-FAMILY FATAL FIRES DFS SURVEY OF THE 213 COMMUNITIES REPORTING FATAL FIRE EVENTS IN 1- & 2- FAMILY HOUSING (1986 – 2005):

Between 1986 – 2005 there were 561 fatal fires in 1- & 2- family residences in Massachusetts. The following information reflects only the fatal fire events.

- 677 civilian fire deaths
- 262 civilian injuries

- 440 fire service injuries
- $40.3 million in total damages (561 fires – see above)

Between 2001 and 2005 there were 25,097 structure fires (including fatal fires) reported via MFIRS in 1 & 2- Family homes

- 130 civilian deaths
- 144 civilian injuries
- 1,118 fire service injuries
- $339 million in total dollar loss (25,097 fires – see above)

This Survey reveals that 20 fatal fires (for the timeframe 1986 – 2005) occurred in homes built after 1975 (1975 is when the Massachusetts State Building Code came into effect for the first time).

- 20 civilian fire deaths
- 6 civilian injuries
- 13 fire service injuries

It is noted that relative to information presented above, extracted from the Massachusetts Fire Incidence Reporting System (MFIRS), MFIRS data is considered by some to report conservatively low.

OTFRSC FOLLOW-ON SURVEY

The OTFRSC voted to pursue a follow-on Survey to the DFS Survey in an effort to better understand the fire event, the nature of the victims, and if, for example, older electrical systems were problematic or if smoke detectors existed at all or if smoke detectors were functioning, etc., or simply to ascertain if older housing stock played any significant role in reported residential fires.

A sample "BUILDINGS – FIRE FATALITIES SURVEY (1-6-09)" Survey Form with its family of questions asked can be found in Appendix C of this Report.

Also included in Appendix C1 of this Report, please find a Spreadsheet of detailed Survey answers related to the responses below.

213 cities and towns were queried in this follow-on Survey with 20 communities (some w/multiple fatal fire events) responding.

No Survey response was sufficient to ascertain if older electrical systems or older housing construction were trending as problematic.

In Summary, of the 40 fatal fires surveyed (refer to Appendix C2):

- 7 homes had no smoke detectors.
- 2 homes were reported as having smoke detectors that were not operating.
- In 13 homes it was not known or reported if smoke detectors existed or were operating.
- Hard wired, interconnected smoke detectors were reported in 3 homes.
- Both ionization and photoelectric smoke detector types were identified in homes w/fatal fires.
- Of 38 reported fatalities, 14 victims were reported intimate with the fire.
- 16 of the fatalities were caused by improper use of smoking materials.
- The majority of fire victims were adults ranging in age from 25 to 93 but four children of ages 2, 2.5. 5 and 10 were victims in three of the reported fires with the 10 year old in a fatal fire where smoke detectors were not present and the remaining 3 children in fatal fires where the status of smoke detectors was not reported.

Based on the DFS Survey discussed above there were 20 fire related deaths between 1986 and 2005 in homes built since 1976 with hard wired smoke detectors. Of those 20 deaths, 4 victims were identified as intimate with the fire event (those victims intimate with the fire are often assumed lost) therefore the total number of deaths is viewed as 16.

Of those 16 deaths there is no data on whether or not the smoke detectors were working. If we assume 20% of the smoke detectors were not working it brings the deaths down to 13 in a 20 year period for homes with working hard wired smoke detectors. (See attached HBAM analysis in Appendix E).

III-2 Costs Associated with the Installation of Residential Sprinklers

APPROACH:

Whereas the "1995 Report" contained an estimation of projected costs to incorporate residential sprinklers into a two story, 2700 sq. ft. single family residence (approximately 900 sq. f. per floor plus a cellar of 900 sq. ft.), the approach of the OTFRSC was to essentially interview

installers of residential fire sprinkler systems both in Massachusetts and other parts of the country to better understand what current costs and regulatory environment exist and to try to identify why cost differences and regulatory requirements differences exist.

FINDINGS:

As reported in the "1995 Report", the design of residential fire sprinkler systems constitutes the practice of engineering and therefore a Massachusetts-registered Professional Engineer, competent to design residential fire sprinklers would be required to design the fire sprinkler system.

Exception: It is understood that allowances addressed in MGL c.112 § 81R would permit a Massachusetts-licensed Sprinkler Contractor to prepare plans, specifications, shop drawings, etc., for work to be installed or being installed by the same person, firm, partnership or association preparing such plans, specifications or shop drawings (refer to MGL c.112 § 81R) and under such conditions a Licensed Professional Engineer would not necessarily be required.

There has been a recent request to the Bureau of Pipefitters, Refrigeration Technicians and Sprinklerfitters to consider a restricted one- and two-family sprinkler contractor License with the intention being to allow more Licensed Sprinkler Contractors – such a proposal intended to assist in lowering design costs - but this matter is only at the discussion stage as of mid-2009 and it is not known if such request would necessarily be adopted.

Fire Sprinkler design requirements and installation costs are influenced by the size and layout of the house and by water availability (volume flow rate and acceptable pressure).

Water may be available from a municipal source or may have to be drawn from a well or from a stand-alone tank.

Where water is available from a municipal source, fire sprinkler system design is presently further influenced by requirements (initial and possibly ongoing, "in perpetuity" monetary charges) of the local Water Purveyor who may additionally dictate a particular design over the numerous designs acceptable under NFPA 13D (see Water Purveyor Requirements below). The Massachusetts Water Works Association has, however, expressed interest in learning more about residential sprinkler systems.

At the apparent "low end" of costs - this information is obtained from an NFPA research paper, "Home Fire Sprinkler Cost Assessment", issued in September of 2008 - a particular community in Massachusetts (North Andover), has been able to incorporate residential sprinkler systems, with CPVC piping for "stand-alone" systems for a cost ranging from $1.10 per sprinklered square foot to $1.36 per square foot of living spaces as the cost to the Builder.

OTFRSC informative discussions with those familiar with this community and system costs indicate that Building and Fire Officials and the Water Purveyor were able to agree to essentially minimum NFPA 13D system types with no excessive features required incorporated above baseline requirements (although a local water flow alarm was incorporated and attached garages were sprinklered – neither required by the NFPA-13D Standard) and with apparently no rigorous first costs or continuing charges imposed by the Water Purveyor).

Presently, concurrent Licensed Trades labor requirements in Massachusetts (Plumber and Sprinkler Contractor Licenses) preclude installation of a multipurpose piping system (generally believed to be the least expensive NFPA 13D system to design and install) unless the installer is dual licensed in both Plumbing and Sprinklerfitting.

Stand-alone pump and tank and or stand-alone pressurized tanks providing the water source, flow rate and necessary pressure appear to cost in the $2400 to $4500 range (as reported by a particular vendor of such pump and tank systems – prices could be different for other manufacturers' products) provided that supervision of the system is not imposed (NFPA 13D does not require supervision) and this cost is for the pump/tank/pressurized tank and not for the entire fire sprinkler system. If battery back-up of electric pumps is chosen (not required by the Standard), then applicable first costs do increase.

The Home Builders note that the above costs are installation costs and do not reflect the cost to the end user or homeowner. Based on an HBAM survey of its members installing NFPA 13D sprinkler systems, the average cost to the homebuyer in Massachusetts was $13,574.59 per home or $4.02 per sq. ft. (See Appendix E).

The Fire Services note that identified costs (refer to the following paragraph) come from MFIRS and show the reported cost of losses involving dwellings with and without a fire sprinkler system in one- and two-family homes which include both the measured costs to the municipality in terms of direct firefighting costs per residential fire; short and long term injuries to Firefighters and ground water contamination issues.

Information has been provided that shows that since 1986 to present, on average per year in Massachusetts, the cost of: property damage plus values assigned for injuries and deaths, for an unsprinklered home run approximately $120 million dollars averaged over the 1986 – 2007 timeframe per year whereas for a sprinklered home such costs run about $65,000/year – These cost estimates are based on EPA report values where $2million is assigned to a human death, thus it is argued that the information provided in reviewing the MFIRS that from 1986 to 2007, on average the cost of fire in Massachusetts is $ 120 million per year for unsprinklered one and two family residential properties. The cost on average for a sprinklered one and two family residential property for the same timeframe is $65,000 per year. These figures include the following values: $ 2 million per life lost, $40,000 per firefighter injury, $10,000 per civilian

injury and the property value reported to MFIRS (although traditionally very underestimated). This cost does not include the cost of the fire department response and any additional environmental or property damage and a figure of $2 million as the value of a human being could be argued low.

III-3-System Maintenance and Testing Issues

Required maintenance by the homeowner of 13D systems would be expected to comply with requirements of NFPA 13D (2007 Edition) Sections 4.2, 4.3. Further guidance is provided in Appendix A4.2.1, A.4.2.4, and A.4.3.

Maintenance and testing requirements would/could involve:

- Replacing operated or damaged or painted sprinklers
- Where antifreeze is involved antifreeze solution, on an annual basis would need to be brought to required specific gravity or replaced w/a new solution and the sprinkler system refilled.

A recommended monthly maintenance program (per the Appendix to NFPA 13D), includes:

- Visual inspection of sprinklers to ensure against obstruction of spray.
- Inspection of all valves to ensure they are open.
- Testing of all waterflow devices and any associated alarm systems (water flow devices and accompanying alarms are not required by the Standard but could be required by Home Insurers).
- Antifreeze tests of solution (if antifreeze is present) are recommended performed two or three times during the freezing season.
- Dry systems (if they exist) are recommended tested by placing the sprinkler system under air pressure and any leak that results in a drop in system pressure greater than 2 psi in 24 hours should be corrected
- Operating of all pumps where utilized per requirements of NFPA 20.
- Checking of water levels in fixed tanks.

III-4-Labor Issues Revolving Around the Installation of Fire Sprinkler Systems

Labor issues fall into several categories:

(a) The design of a residential fire sprinkler system invokes the practice of engineering and a Massachusetts-Registered Professional Engineer, competent in the field, is required to design the fire sprinkler system except where the provisions of MGL c.112 § 81R apply.

(b) Multipurpose piping systems, believed to be the least expensive fire sprinkler systems, cannot be readily installed in Massachusetts as dual licensing is required for installation of the potable system (a Massachusetts-licensed Plumber) and concurrent capturing of the fire sprinkler system (a Massachusetts-licensed Sprinkler Contractor) – this legitimate labor issue invariably results in the fire sprinkler system, within the building, being a separate system from the potable system.

(c) Municipality-approved "drain layers" generally are not Massachusetts-licensed Sprinkler Contractors, yet, where the fire sprinkler system is independent of the potable water system (starting at the street), a Massachusetts-licensed Sprinkler Contractor (not a "drain layer") is presently statutorily-required to oversee the fire main installation (MGL c.146 § 84).

III-5-Potable Water Supply Issues / the Water Purveyor

GENERAL CONCERNS

Concerns regarding prohibition of multipurpose systems by Water Purveyors and;

First costs, and ongoing fees and inspections by the municipality to the homeowner after the home is purchased.

DETAIL

Fees presently imposed by Water Purveyors are variable from community to community and fall into essentially three categories; one of fixed costs associated with installing the fire main and/or supporting a "water development fee"; one of continuing, "in perpetuity" costs for the right to retain the fire sprinkler system and another fee associated with backflow preventer testing and where such backflow preventer testing may be required one or more times per year.

For the cost information provided immediately below see Appendix D1 (Information extracted from a Water Purveyor Survey):

- For ¾" fire main piping, fixed, up-front costs are reported ranging from $25 -$2700 (in certain communities a ¾" fire main is not allowed and one must use at least a 1" fire main).
- For 1" fire main piping, fixed, up-front costs are reported ranging from $25 - $4500.
- For 1 ½" fire main piping, fixed, up-front costs are reported ranging from $25 - $9000.

- For 2" fire main piping, fixed, up-front costs are reported ranging from $25 - $14,400.

- Water development fees, where implemented, may or may not be another way to address fire main requirements or in some instances may be added to the fire main costs and are reported ranging from $0 – $9367.

- Some Water Purveyors charge by the foot of fire main installed – "by the foot" fees are reported ranging from $4 - $225.

- So called "in perpetuity" fees (annual fees) are reported ranging from under $1 per day to $1000 per year.

- Certain ancillary fees are additionally charged in some communities.

For the cost information provided immediately below see Appendix D2:

- Backflow Preventer testing frequencies are reported ranging from once a year to–at least semi-annually.

- Backflow preventer test costs, per test, for a simple double check valve assembly (DCVA) are reported ranging from $0 - $150.

- Backflow preventer test costs, per test, for more sophisticated reduced pressure zone devices (RPZ) are reported ranging from $0 - $150 (RPZs as a minimum, are required by the Water Purveyor when the fire sprinkler system contains antifreeze or other non-water chemicals).

III-6-Building Code, Fire Prevention Code and Other Regulatory Enforcement Issues

GENERAL CONCERNS:

Inconsistent enforcement of requirements for 13D systems. Experience indicates that in some instances, installers who are currently installing systems can be required to go well beyond the requirements of a "baseline" NFPA 13D system.

Lack of a special license to install "13D" systems.

DETAIL:

Regulators sometimes require participation of a Registered Professional Engineer – often a Fire Protection Engineer – in spite of the fact that a duly licensed person operating per MGL c.112 § 81R has otherwise been properly involved in the laying out and installation of the fire sprinkler system (MGL c.112 § 81R) – this has the effect of increasing costs and delaying construction. This issue will require in-depth educating of Building and Fire Officials.

Regulatory Appeal Routes

If residential sprinklering is eventually set forth in 780 CMR, Building Officials enforce such requirements (MGL c.143 §§ 3 & 3A) and the administrative appeal route described in MGL c.143 § 100 applies (i.e., first administrative appeal is to a Building Code Appeals Board and not to the courts).

If Fire Officials attempt to enforce requirements of 780 CMR, such would be inconsistent w/enforcement empowerment requirements of MGL c.143 § 3 but such action could then be argued to cause appeal under MGL c.148 § 31 which currently may result in appellants seeking appeal to the courts (note that MGL c.148 § 28A, in such instances, is intended to assure Building Official control of the requirements of 780 CMR but if such is not followed this has an adverse affect on any appeals sought and can impact what type of fire sprinkle system is then "allowed" in a particular community, impacting system costs).

Impact of Bylaws and Ordinances

If municipal persons, other than Building Officials, attempt to dictate fire sprinkler design requirements or if such requirements are attempted captured by Bylaw or Ordinance, likewise the uniformity of allowed minimum requirements of fire sprinkler systems and the resulting appeal routes are altered.

III-7- Home Shut Down Periods

The question has arisen: "Would residential sprinklers be required operating if the building is shut down and not occupied?"

This question arises out of recognition that at least in vacation areas of Massachusetts, it is not uncommon to close down a vacation property in the off season; additionally it is observed that if one cannot drain down the sprinkler system then the building would have to be heated when it is unoccupied and such unnecessary energy consumption would conflict with energy policies such as the Global Warming Solutions Act (GWSA).

The legal dilemma facing Regulators in this matter is that MGL c.148 § 27A precludes building owners from shutting off fire protection systems without first procuring a written permit to do so from the head of the fire department of the city or town where the building is situated.

In response to these concerns, the Fire Chiefs of Massachusetts, Inc., (FCAM, Inc.) have presented the following draft position to the OTFRSC:

"Regarding seasonal occupancies:

The Executive Board of the Fire Chiefs association concurs ~~with me~~ that if the utilities are shut off to the dwelling during the off season that (due to the fact that the sprinkler system is a life safety system to protect the occupants) that the fire system be allowed to be secured also.

Further education and discussion regarding non-occupied buildings is recommended."

In response to this presented position of FCAM, Inc. it may still be necessary to amend MGL c.148 § 27A to assure uniform statutory allowance of fire sprinkler system shut down during extended periods where the building is vacated and utilities are turned off.

III-8-The Home Insurance View

Based on studies performed by the NFPA, all nationally operating Insurance Companies are providing a premium credit for homes with a residential sprinkler system.

Relative to more local Home Insurers, currently no such Insurer has been found to charge an increase in premiums due to possible inadvertent operation of a fire sprinkler head.

The local Insurance view also includes the observation that if home insurance premiums are reduced due to the incorporation of fire sprinklers but such system is shut down in vacation off seasons, the home owner would likely be obligated to report the shutting down of the fire sprinkler system to the Home Insurer for premium and coverage adjustments.

The Insurance Service Organization (ISO) has, as its clients, the Home Insurance Industry, and ISO has issued Fact Sheet in the matter of residential fire sprinklers – please refer to Appendix H for a copy of the "RESIDENTIAL SPRINKLERS ISO FACT SHEET".

III-9 Existing Buildings

As the charge of the OTFRSC was to address new construction one- and two-family dwellings, no evaluation was performed or is provided in this report on existing one- and two-family buildings undergoing renovation or addition.

III-10 Housing Market Impacts

The possible impact on the housing market continues to be difficult to assess as disparate Water Purveyor costs and requirements do exist across the Commonwealth and Building and Fire Regulator impact and/or local Bylaws or Ordinances can drive fire sprinkler design and construction costs above NFPA 13D baseline required costs.

The Home Builders argue that Massachusetts housing costs are among the highest in the nation. Mandating fire sprinklers in one and two family homes will drive those costs even higher. This will have an impact on the affordability of housing in the state and the state's economy."

RECOMMENDATIONS

Certain Fire Service Recommendations:

1. The Bureau of pipefitters should be petitioned to establish a special 1/2 family residential sprinkler license program in DPS.
2. Public Information and Education regarding the advantages of fire sprinkler systems must be made available to homeowners, builders, building and fire officials.
3. DFS and DPS should conduct joint training, for Building and Fire Officials, on residential sprinkler benefits, installations and NFPA 13D requirements.
4. FCAM should promote their position on shutdowns to all fire chiefs.
5. Organizations should continue their work with MWWA to educate water officials on residential sprinklers.
6. Support S-983.

Certain Building Official Recommendations:

1. The Commonwealth of Massachusetts, Department of Public Safety should consider a **"Limited Fire Sprinkler Installer License"** to allow either plumbers or sprinkler fitters to install a 13D fire sprinkler system.
2. For a NFPA 13D system design/permitting, a licensed installer or a person with a NICET certification in fire sprinkler design should be allowed to design this limited area/flow system (It is observed that to get approval to allow NICET certified design one would have to successfully engage the Boards of Professional Licensure of Architects and Engineers, respectively and pursue Legislative changes to current General Law – DPS Personnel comment).
3. The Commonwealth of Massachusetts through the DEP and the MWRA and other applicable state agencies, should pursue allowing of a 13D system to be installed anywhere in Massachusetts with the fire sprinkler supply line installed off the domestic water supply as noted in the NFPA 13D standard with consideration of the use of a check valve as the water supply protection and not a back flow preventer as required in some communities. (Note that it is believed DEP Regulations are viewed as "Conflict Preemption" Regulations and therefore a city or town may be able to require a more stringent set of requirements so having DEP or MWRA support a single check valve approach may not solve the backflow preventer issue – DPS Personnel comment).
4. Local building and fire departments should be trained in what a baseline NFPA 13D system is and additionally trained that at the local level more stringent requirements than those of the baseline NFPA 13D Standard cannot be required.
5. The public would need to be cautioned that if the 13D system was ever shut down and the property owners insurance company was not notified and local fire service approval is not granted, insurance coverage may be denied and the property owner may be subject to criminal penalties for not maintaining as operational, a code required system

Certain DPS Personnel Recommendations:

1. Identifiable, disparate costs appear narrow to Water Purveyor charges and dialogue needs to continue w/the MWWA / if disparate costs cannot be resolved then Legislation should be considered to either force a level playing field (unless the costs are a Constitutional Issue) or Legislation should be considered that via rebate or tax credit, would allow absorption of inordinate costs.

2. Unidentifiable costs are associated w/disparate regulatory requirements / joint education of Building Officials and Fire Officials is absolutely critical to ensuring the rights of the citizenry and the control of costs should residential sprinklers be required via 780 CMR.

3. Should 780 CMR regulations require residential sprinklers in new 1 & 2 family homes, working checklists of administrative and technical requirements and inspection and maintenance requirements need to be created and agreed to and issued prior to implementation of residential sprinkler requirements.

4. The Insurance Commissioner needs to be advised of possible ISO rating issues related to the Massachusetts State Building Code in light of the differences in costs estimated between information presented at the ICC (GO TO Links (or paste links into your browser): http://www.ircfiresprinkler.org/ and; http://www.ircfiresprinkler.org/docs/baltimorehearingdocs/nfpa_comments_on_RB53-RB57.pdf and:

the valuable White Paper from the NFPA (http://www.nfpa.org/assets/files//PDF/Research/FireSprinklerCostAssessment.pdf) and observations presented in this OTFRSC white paper (i.e., measurable differences in costs projected to incorporate and maintain residential sprinkler systems in Massachusetts due, in part, to disparate Water Purveyor costs; to local, disparate imposed technical requirements above baseline NFPA 13D requirements and cost differences to Home Owners as opposed to Home Builders).

5. Relative to the observations made in 4., directly above, a very careful further look at both national estimates of fire sprinkler costs and Massachusetts HBAM cost projections should be considered relative to final costs to Massachusetts Home Buyers, not Home Builders.

6. MGL c.148 § 27A needs to be amended to make legally clear that shutting down of fire protection systems is acceptable and allowed by statutory right when one- and two-family homes are shut down in "off vacation" periods ("148 27A" amendment language

should be based on FCAM, Inc.'s caveat language of other utilities in the home also being shut down).

7. ISO recommended insurance premium "breaks" for 1 & 2 family dwellings appear to be recommendations-only and the Home Insurance Industry is apparently not obligated to abide by such ISO recommendations for fire sprinkler insurance premium breaks / If this is the case, ISO is rating states in one way but acknowledging that insurance premium breaks for what ISO will require for high rating may not occur / ISO should be engaged in this matter and the Massachusetts Insurance Commissioner so advised.

8. The issue of existing buildings undergoing substantial renovation or addition wrt possible fire sprinklering being imposed, will ultimately need to be addressed.

APPENDICES

APPENDIX A - "REPORT OF THE ONE AND TWO FAMILY DWELLING FACT FINDING COMMITTEE RELATIVE TO CODE CHANGE PROPOSAL NUMBER 7-94-2"

Note – for this Report, go to (or copy address and paste into your browser):

http://www.mass.gov/Eeops/docs/dps/inf/inf_bbrs_otfrsc_1995_report.pdf

APPENDIX B – Report Based on MFIRS Data – "1- & 2-Family

Residential Sprinklers Massachusetts 1- & 2-Family Fatal Fires 1986 – 2005" - 27 Pages

APPENDIX C-1 – Sample **"BUILDINGS FIRE FATALITIES SURVEY"** – 2 Pages

APPENDIX C-2 "Fatal Fire Survey Responses Spreadsheet" – 1 Page

APPENDIX D-1 – Sample **"SURVEY OF PRACTICES RELATIVE TO THE** INSTALLATION OF ONE- AND TWO FAMILY RESIDENTIAL FIRE SPRINKLERS" – 5 Pages

APPENDIX D-2 – "Water Purveyor General Response" spreadsheet – 2 Pages

APPENDIX D-3 – "Water Purveyor Backflow Preventer Response Spreadsheet" – 1 Page

APPENDIX D-4 – "Water Purveyor Response on Fire Sprinkler Costs" spreadsheet – 1 Page

APPENDIX E – HBAM, Inc., "OTFRSC MA SPRINKLER SYSTEM COST ANALYSIS" - REPORT OF THE HOME BUILDERS REGARDING THE COSTS OF SPRINKLERING" – 6 Pages

APPENDIX F – Intentionally Blank

APPENDIX G – "13D Requirements" Table – 1 Page

APPENDIX H – "RESIDENTIAL SPRINKLERS ISO FACT SHEET" – 1 Page

APPENDIX A

"REPORT OF THE ONE AND TWO FAMILY DWELLING FACT FINDING COMMITTEE RELATIVE TO CODE CHANGE PROPOSAL NUMBER 7-94-2"

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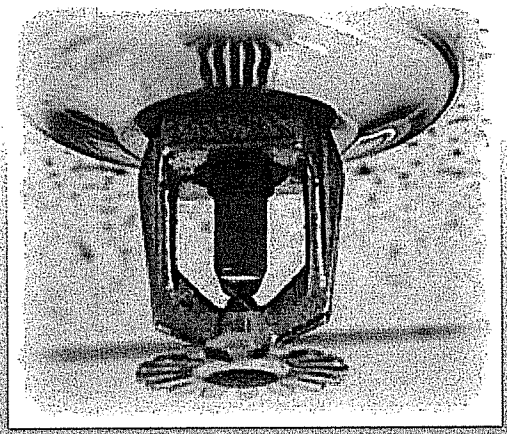
APPENDIX B

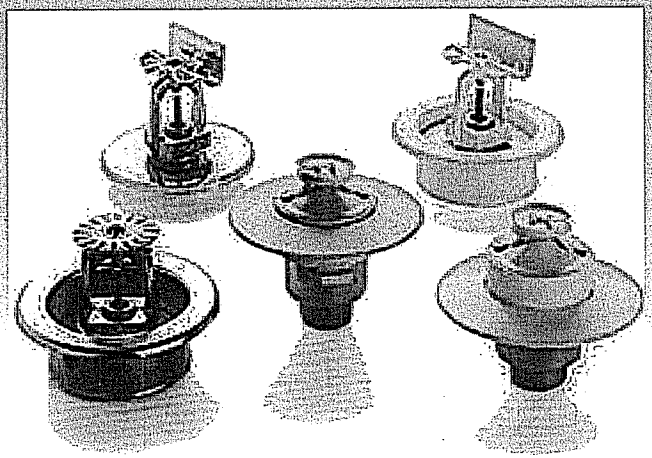
Report Based on MFIRS Data – "1-& 2-Family" - 27 Pages

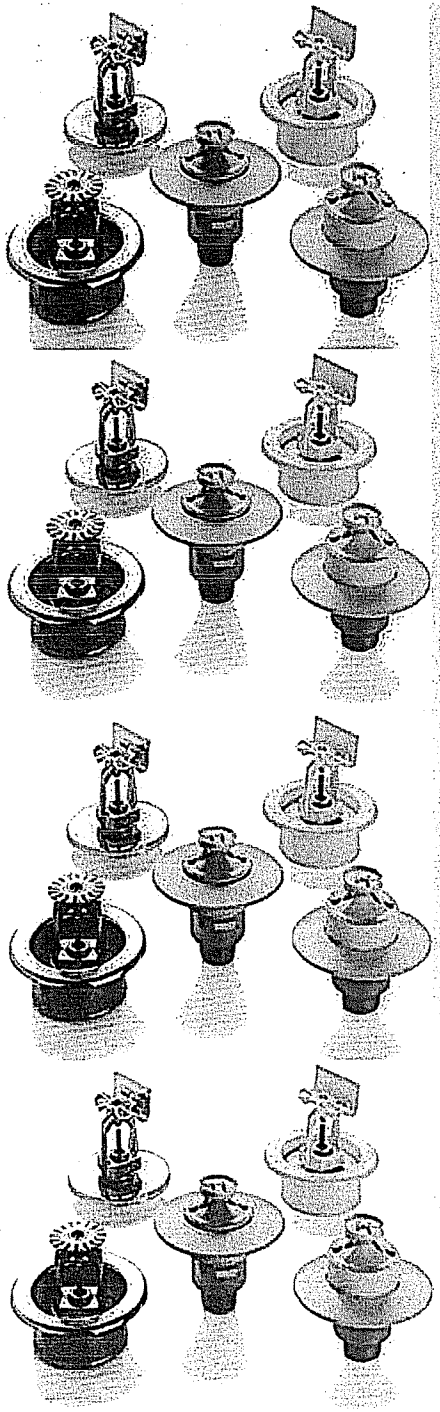


1- & 2-Family Residential Sprinklers

Massachusetts 1- & 2-Family Fatal Fires

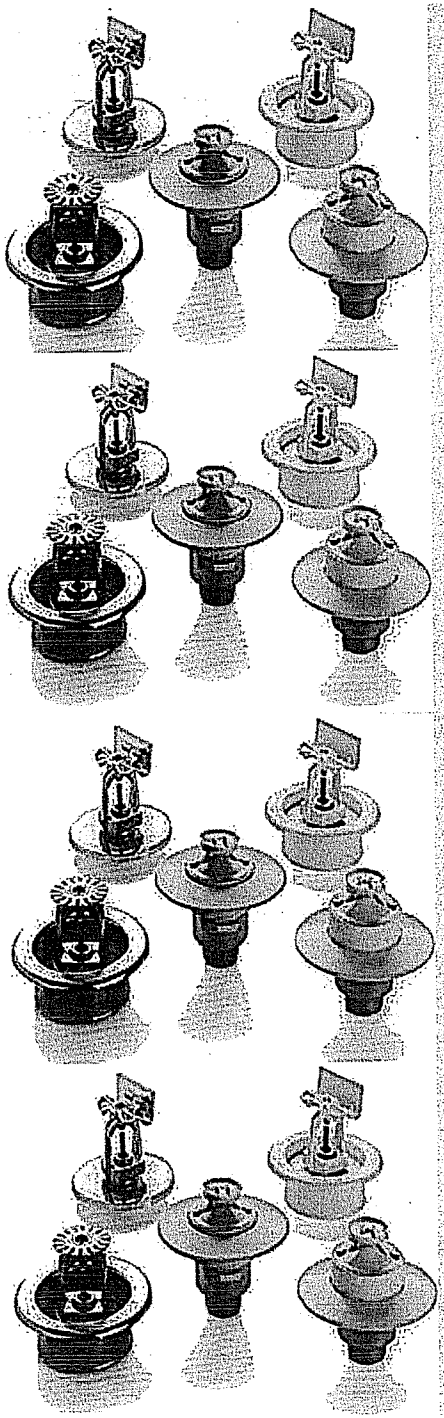
1986 – 2005



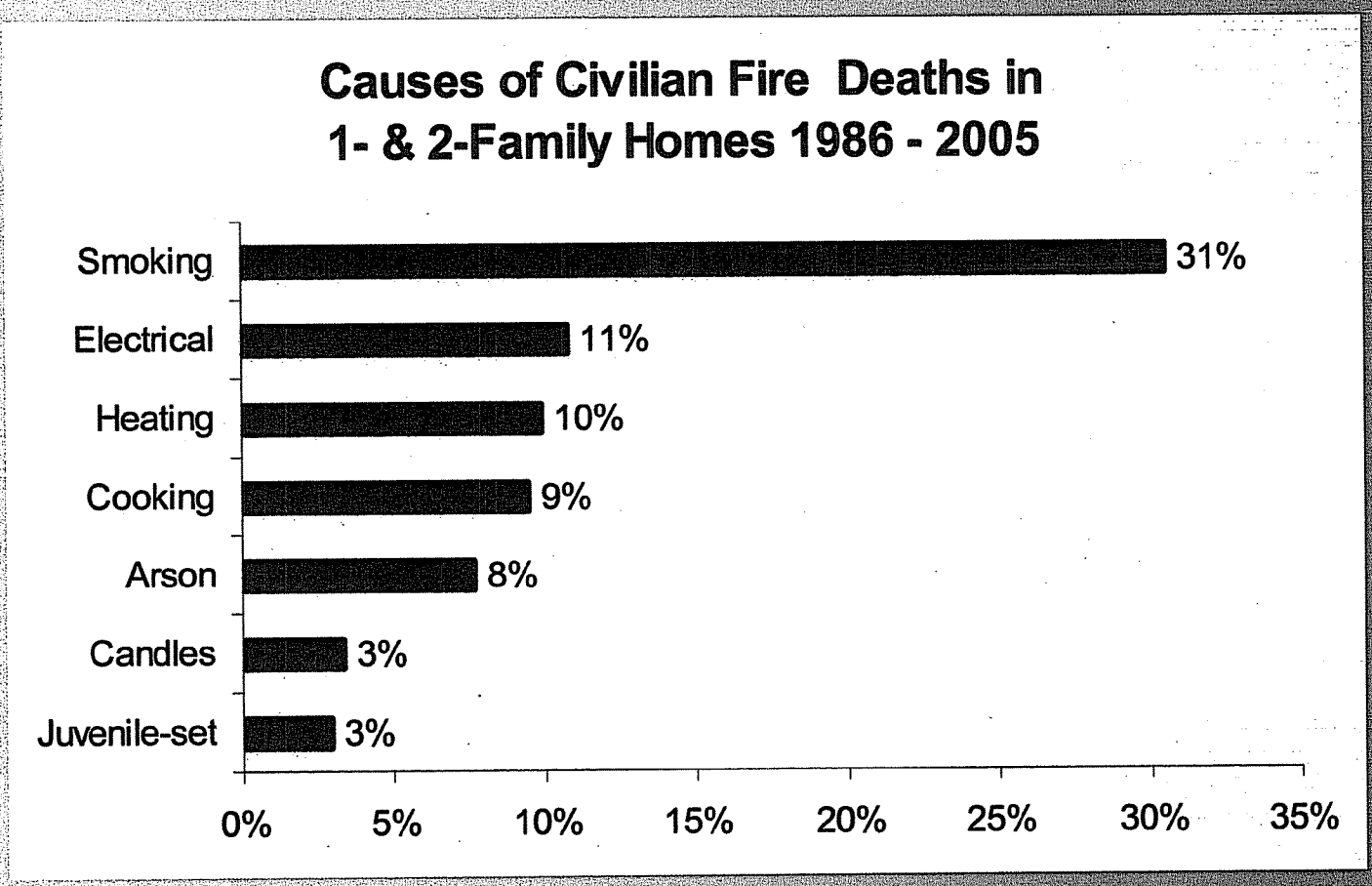


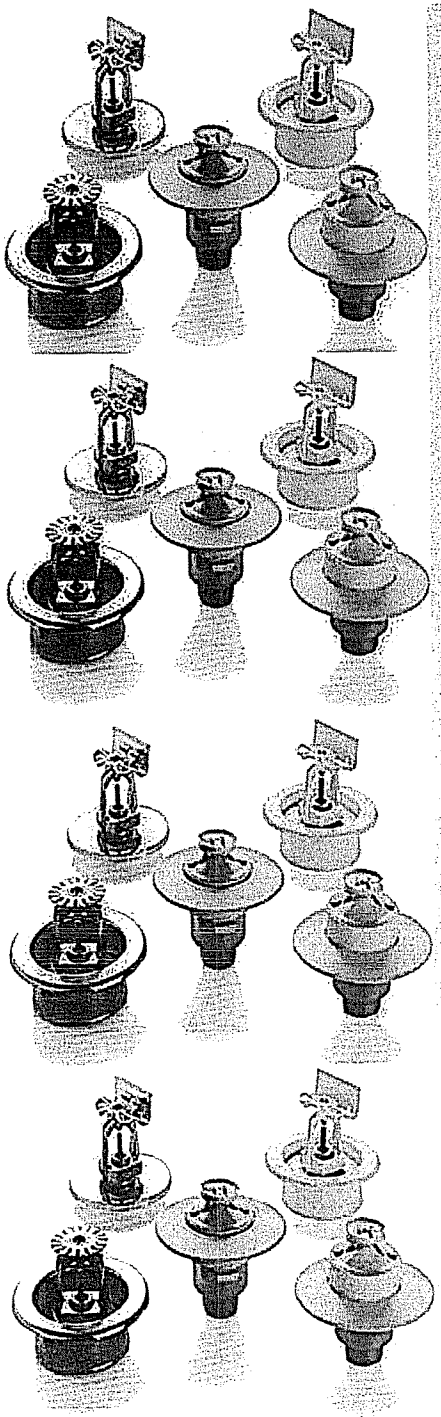
Survey

- Request for survey by OTFRSC
  - To determine causes of fires
  - To determine room of origin
  - To determine if people have died in one and two family homes since 1975
- Review of survey completed by DFS



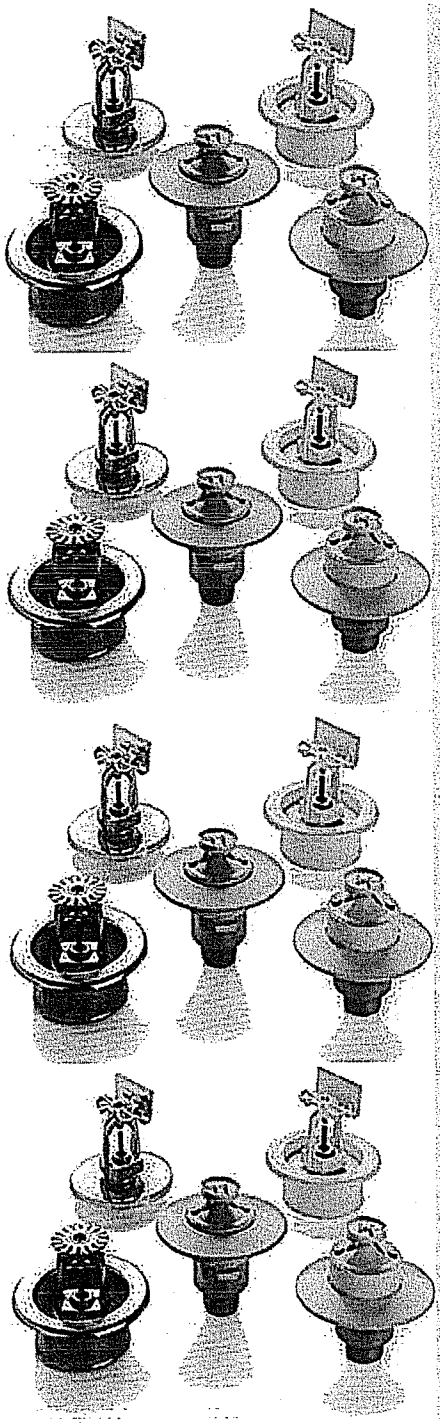
Causes of Fire Deaths in 1- & 2-Family Homes



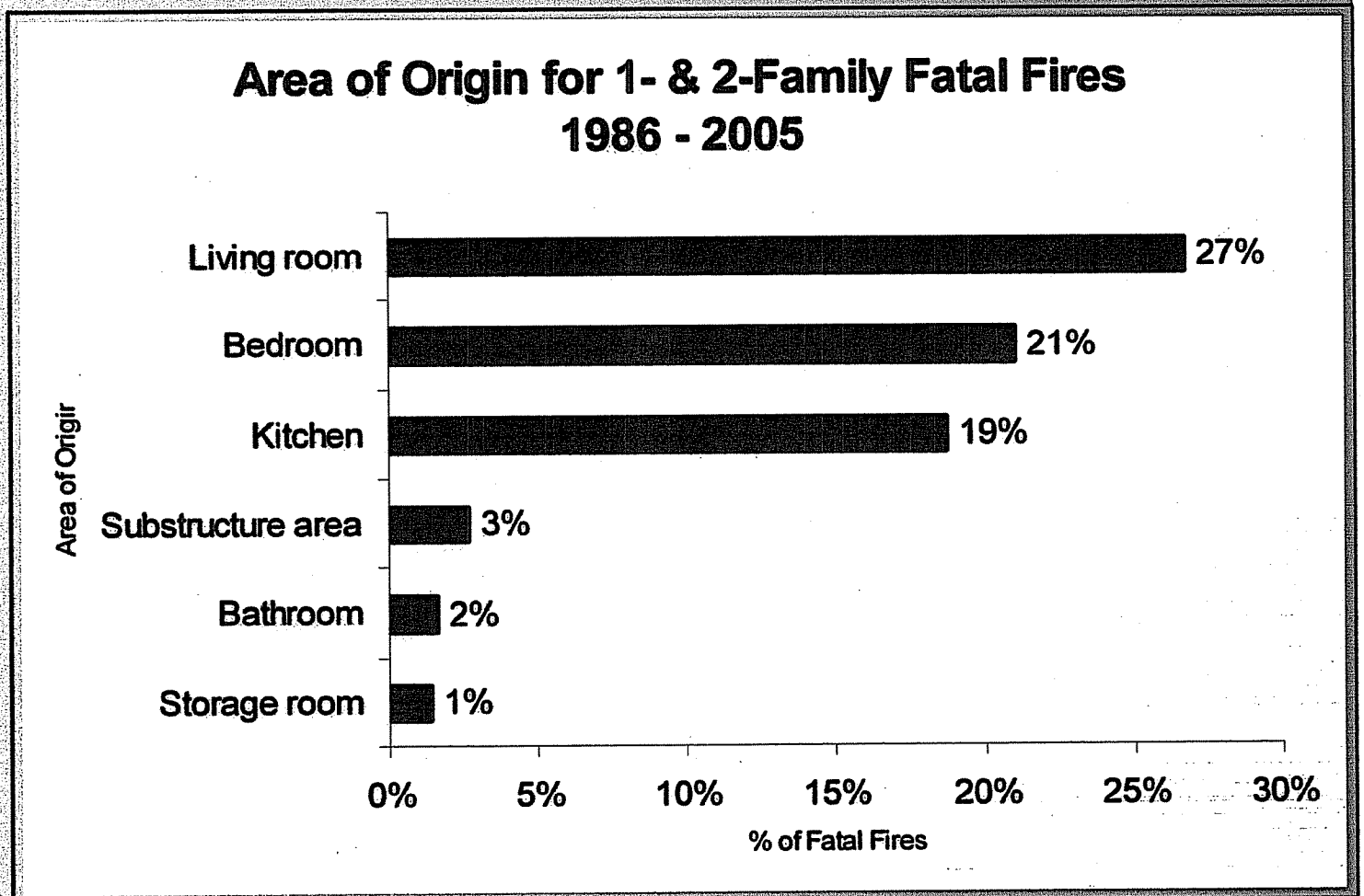


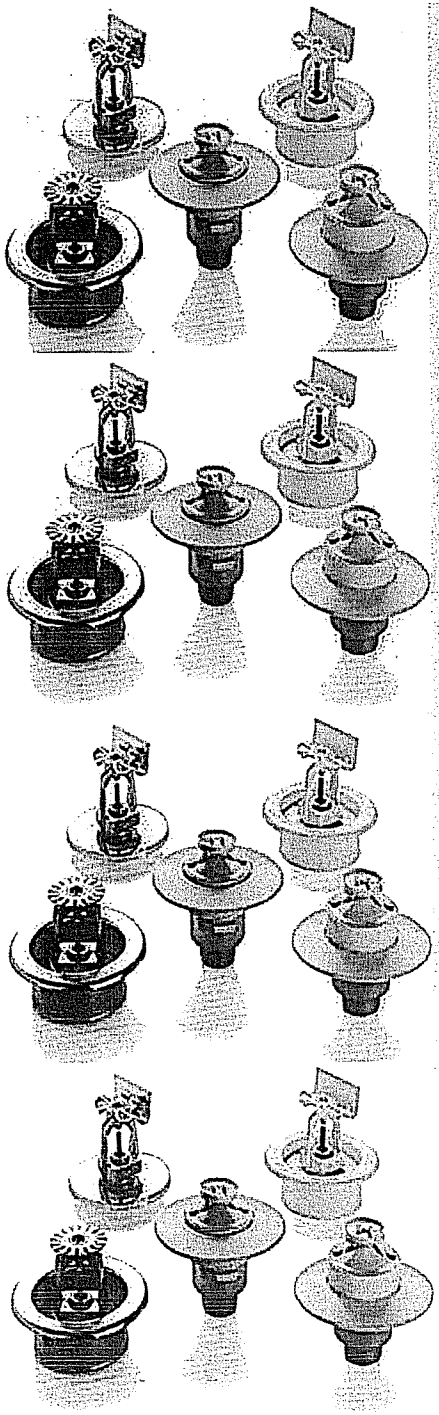
Causes of Fire Deaths in 1- & 2-Family Homes

- Smoking still the leading cause of fatal fires & fire deaths.
  - Caused 32% of fatal fires
  - Caused 31% of these fire deaths
  - Even with the decline of cigarette smoking over the past 20 years.
- Electrical fires were the 2nd leading cause at 11%
- Heating equipment caused 10% of these deaths.
- Cooking fires caused 9% of these deaths.



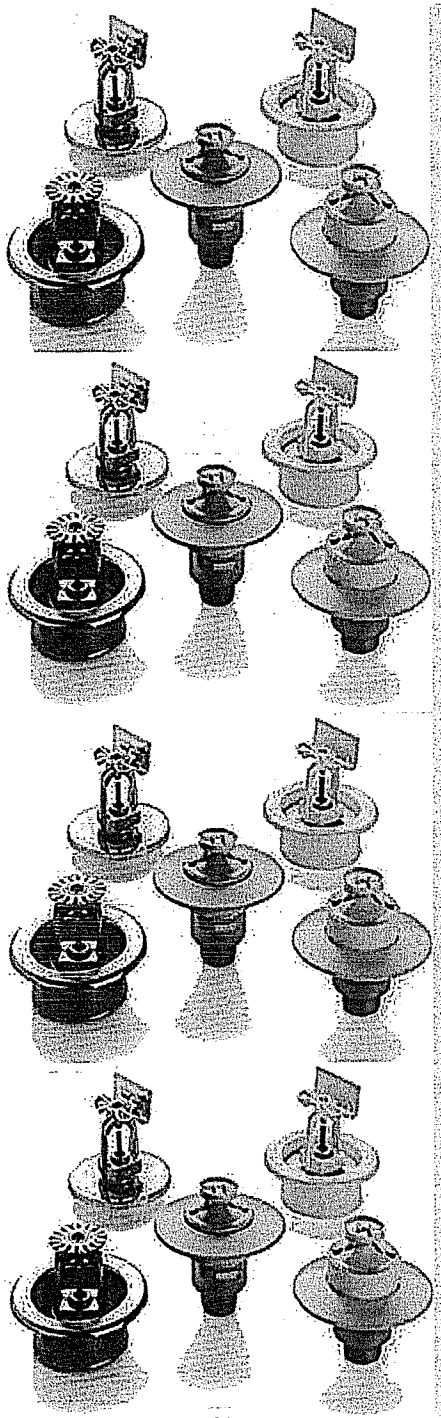
Area of Origin



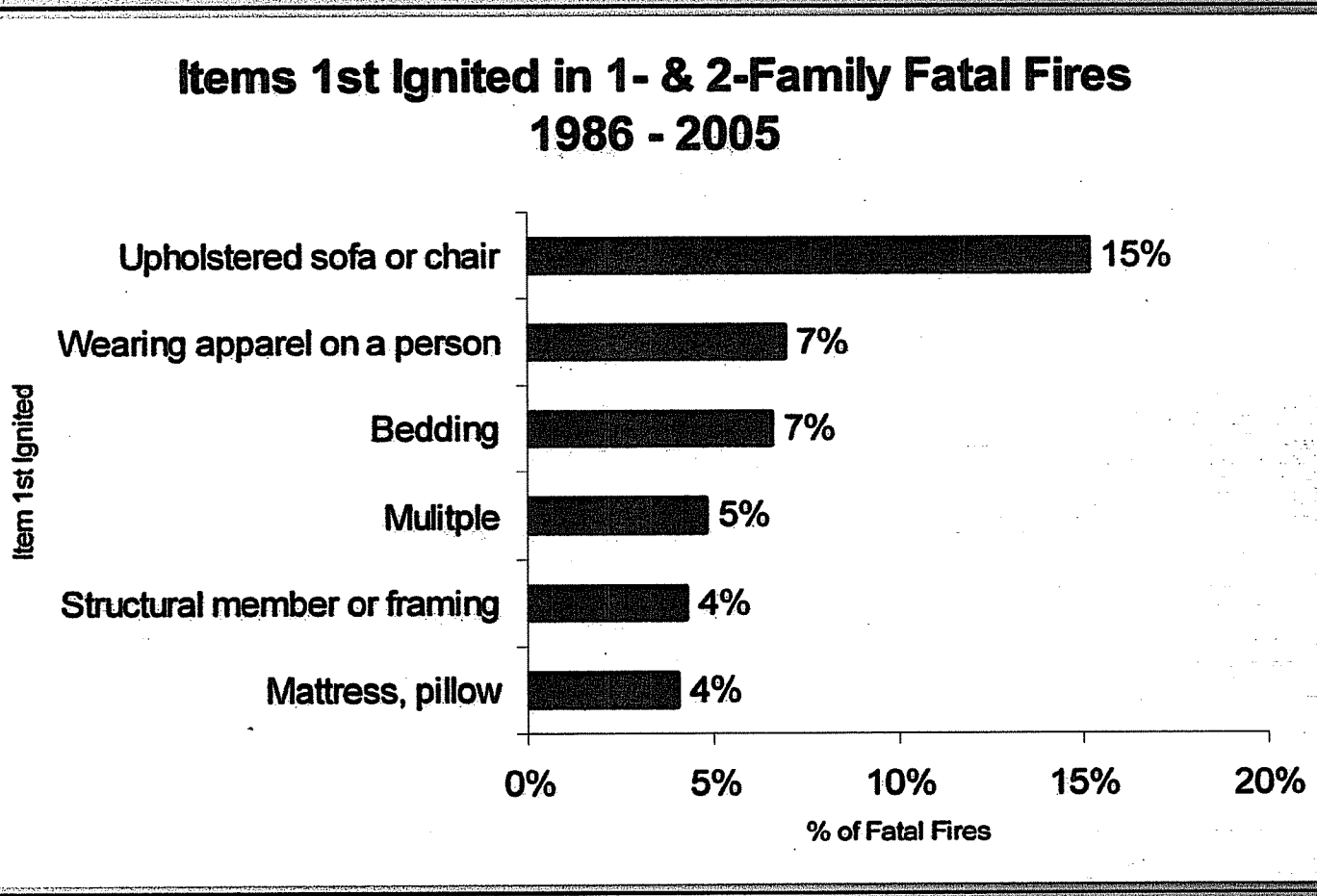


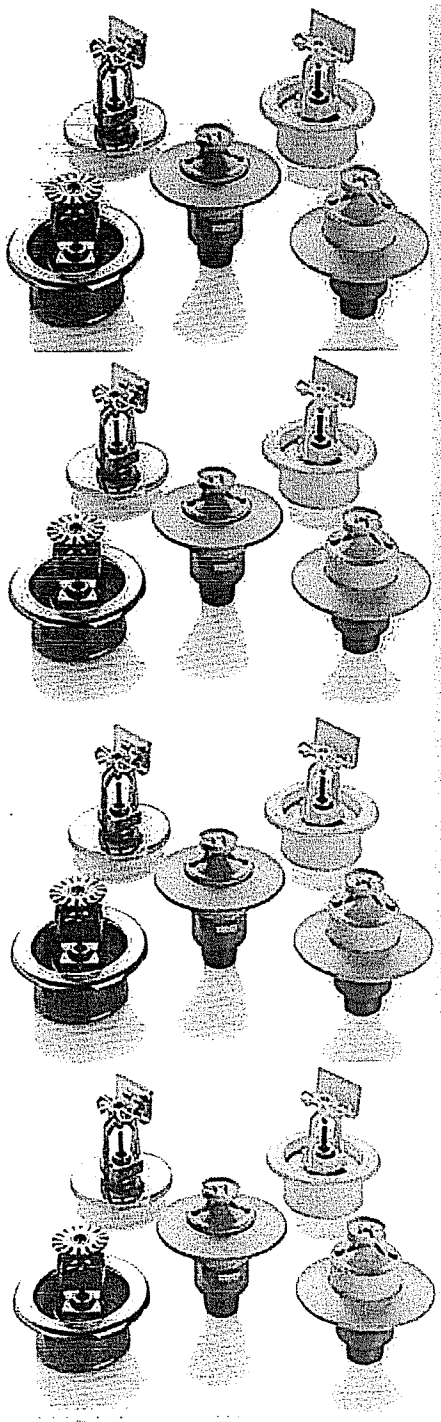
Area of Origin

- 2/3 of fatal fires began in just 3 rooms.
  - Living room = 27%
  - Bedroom = 21%
  - Kitchen = 19%



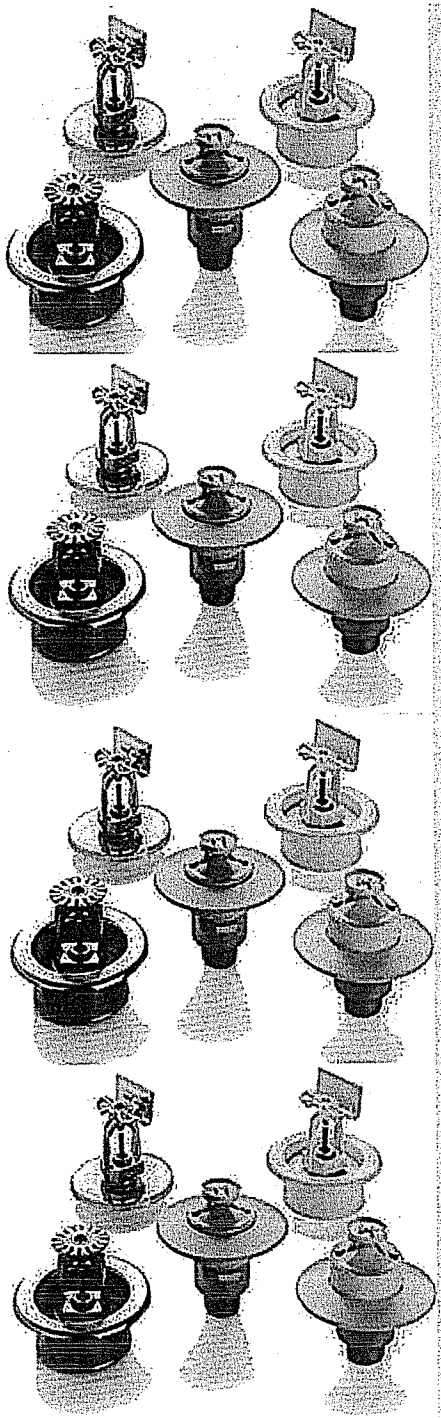
Item 1st Ignited



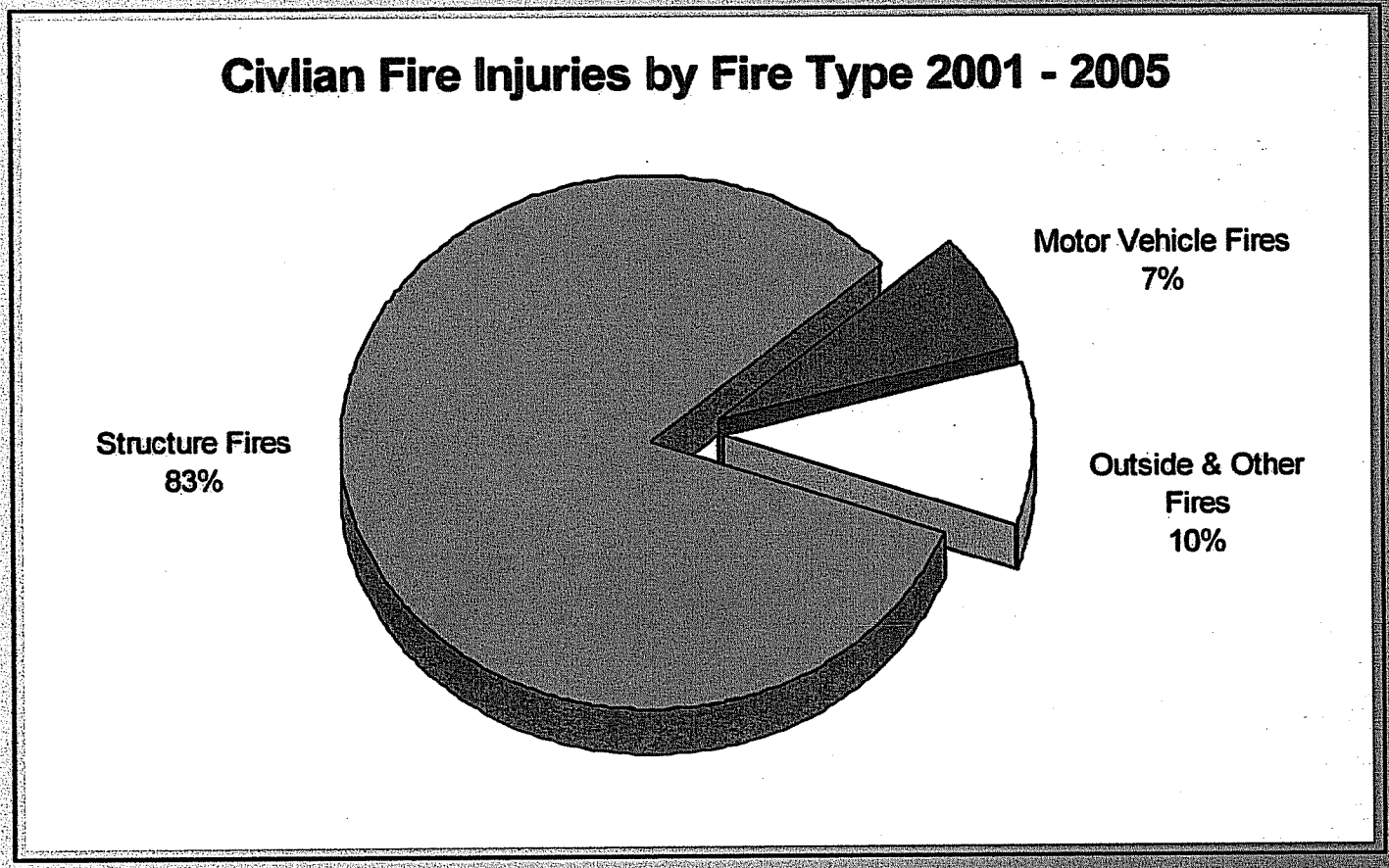


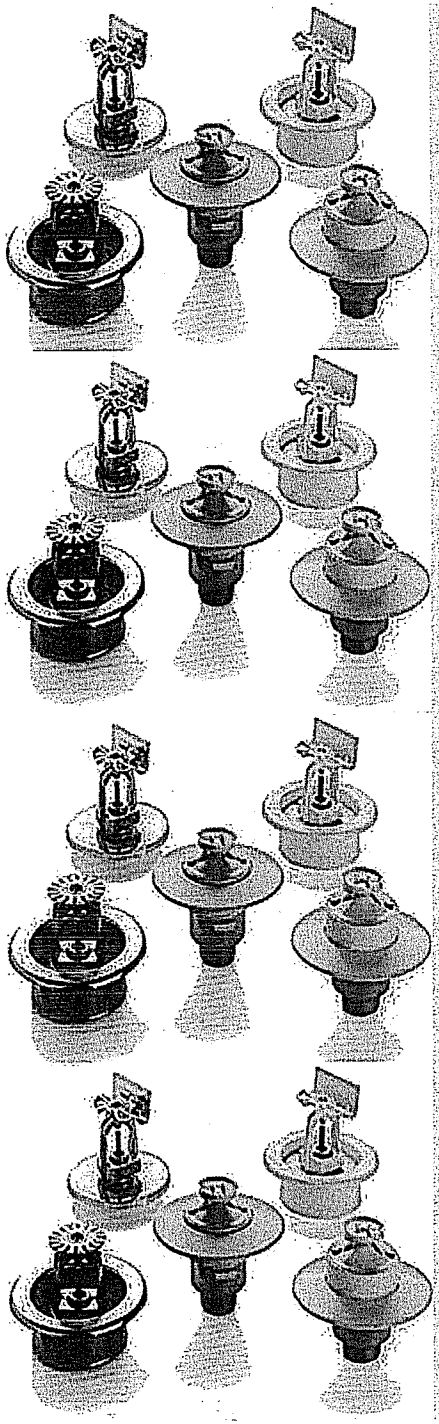
Item 1st Ignited

- Upholstered furniture was the leading item 1st ignited at 15%.
  - Bedding & Wearing apparel on a person = 7%
  - Mattresses & pillows = 4%
- Structural member or framing was ignited in 4% of these fires.

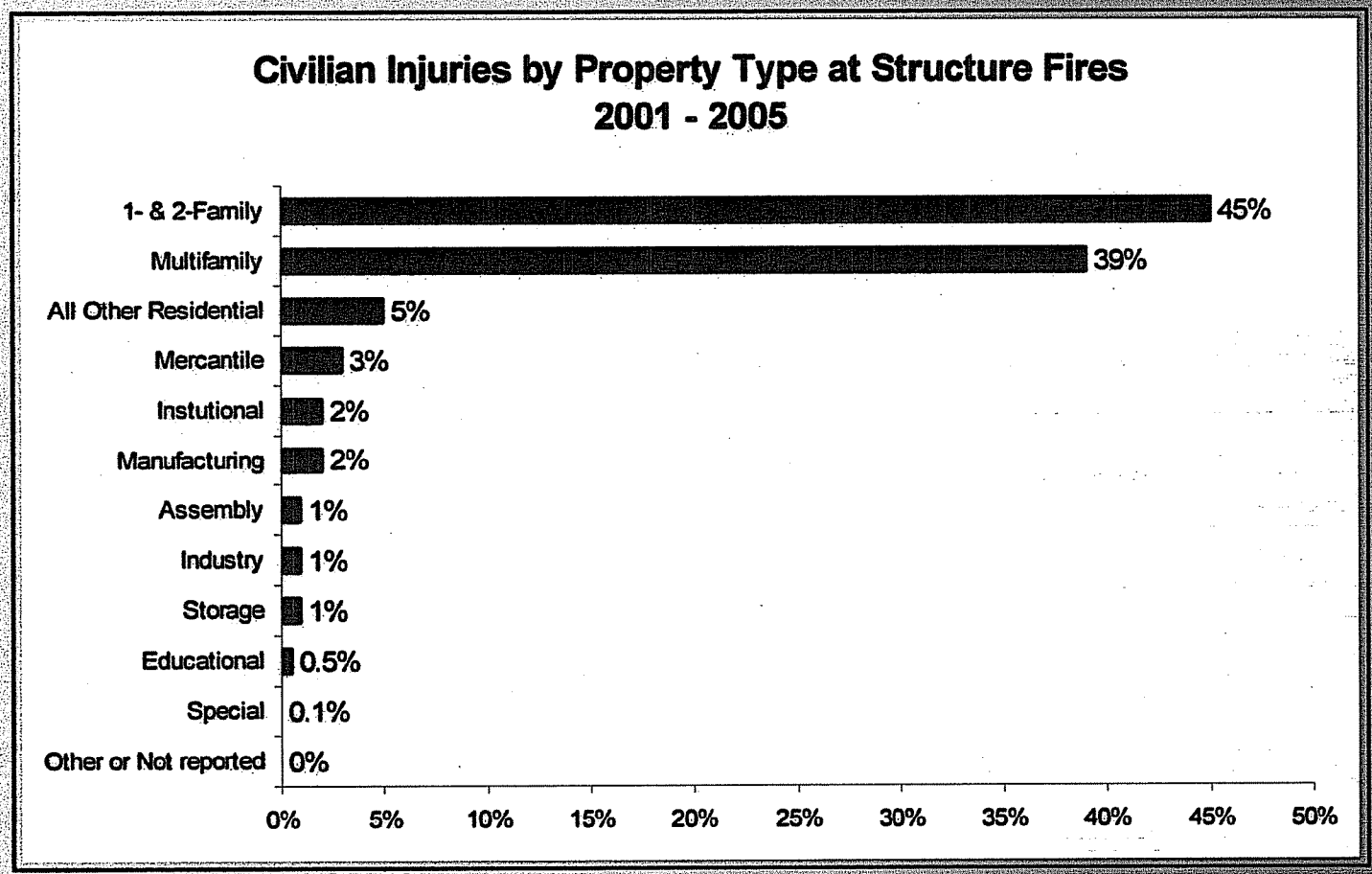


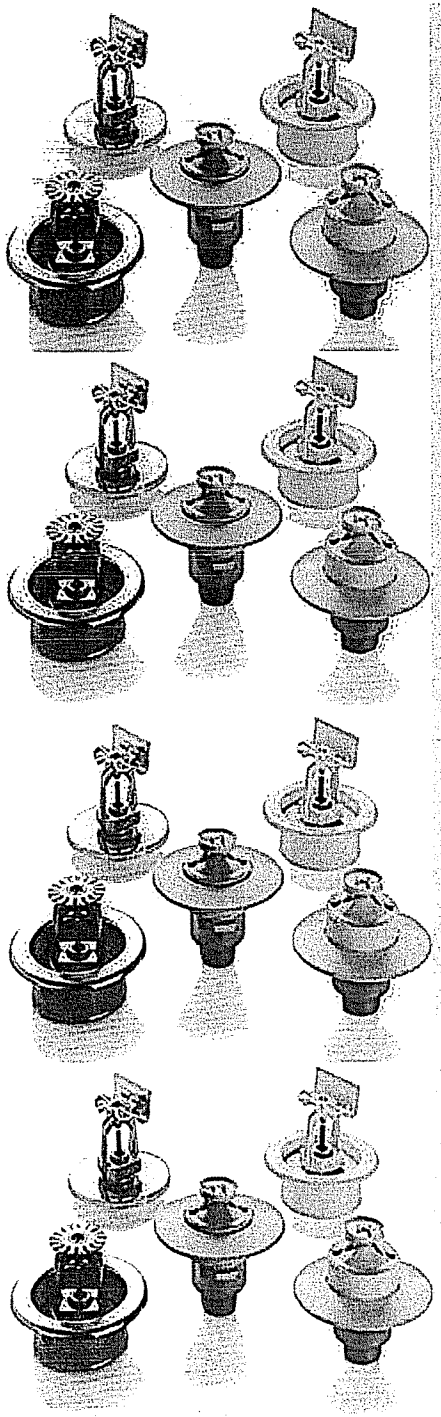
MA Civilian Fire Injuries by Fire Type 2001 - 2005





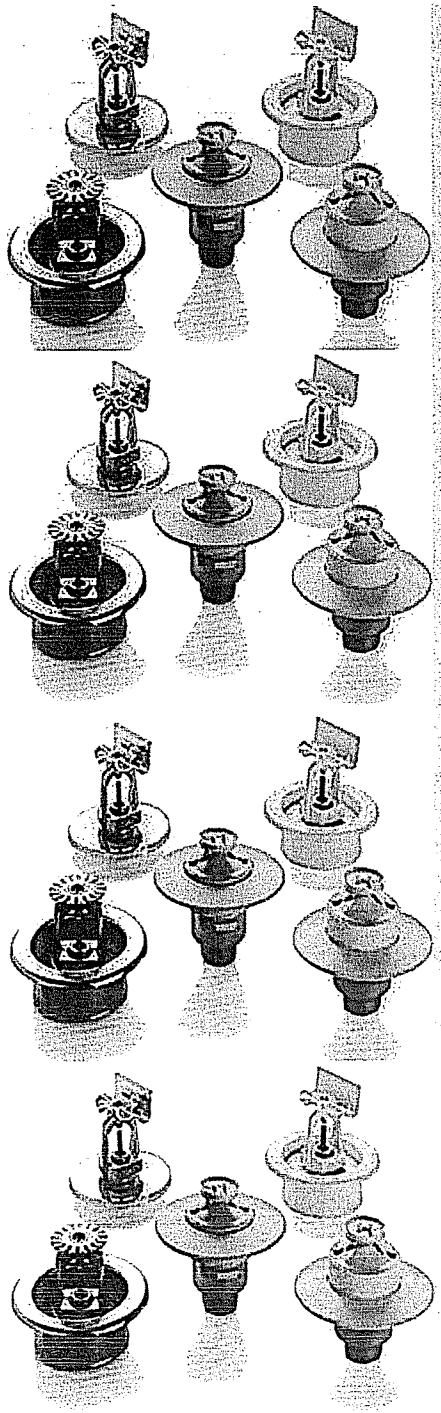
MA Civilian Injuries by Property Type





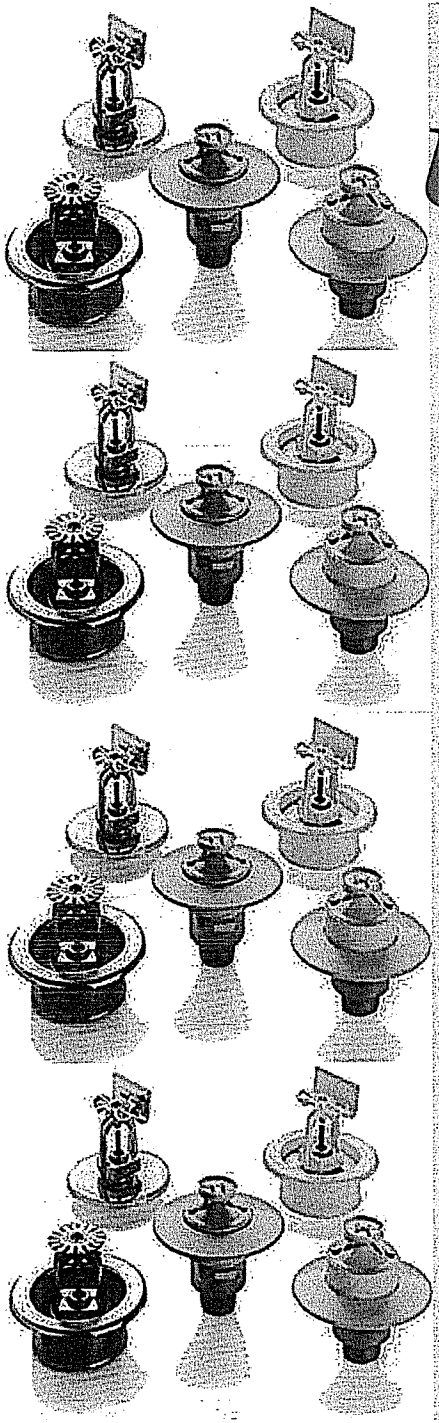
MA Civilian Injuries by Property Type

- Majority of civilian injuries occur in structure fires.
- Majority – 89% - occur in residential structures.
- 45% occur in 1- & 2- Family homes.
  - By far the most injuries occur here.

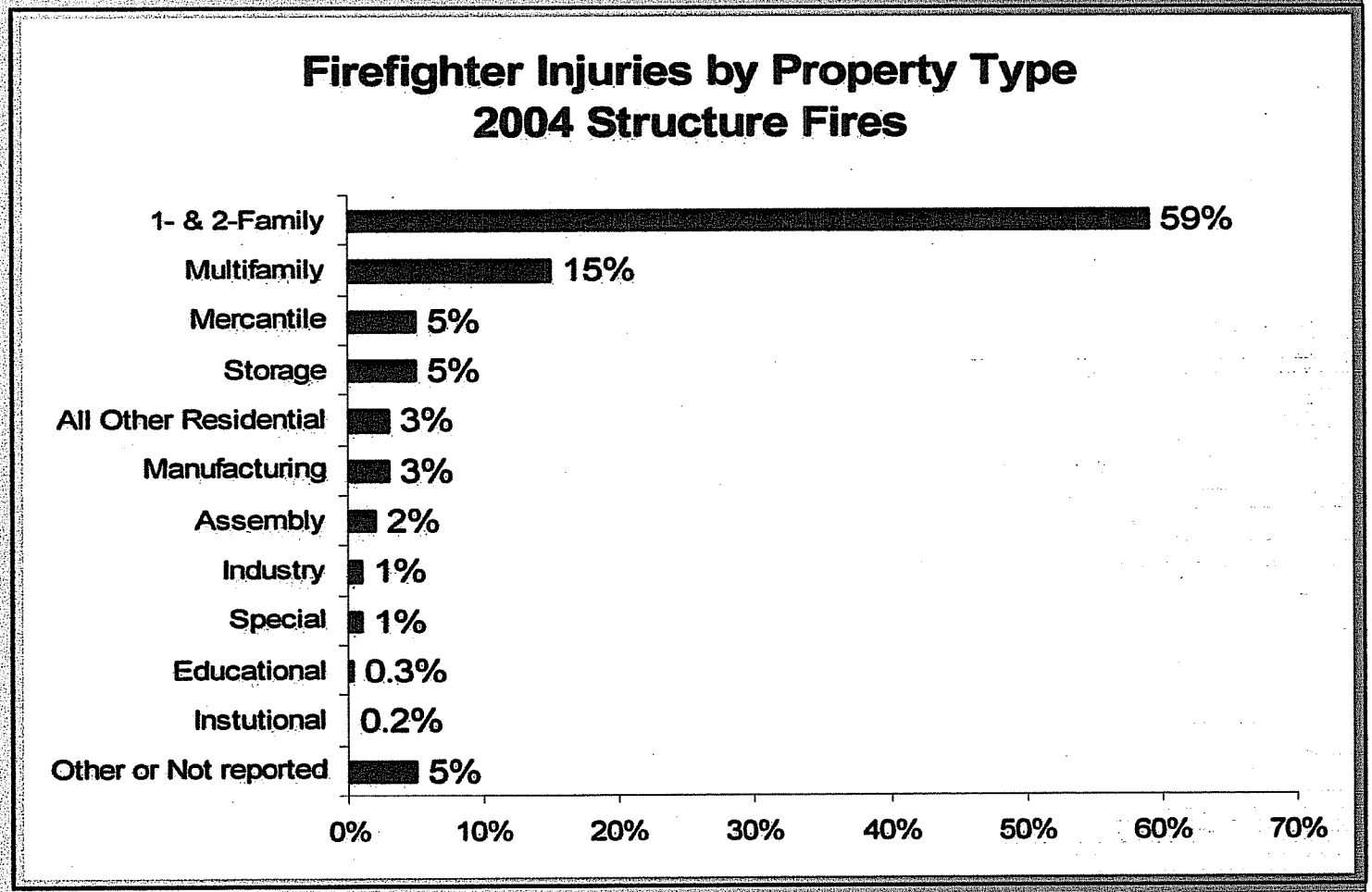


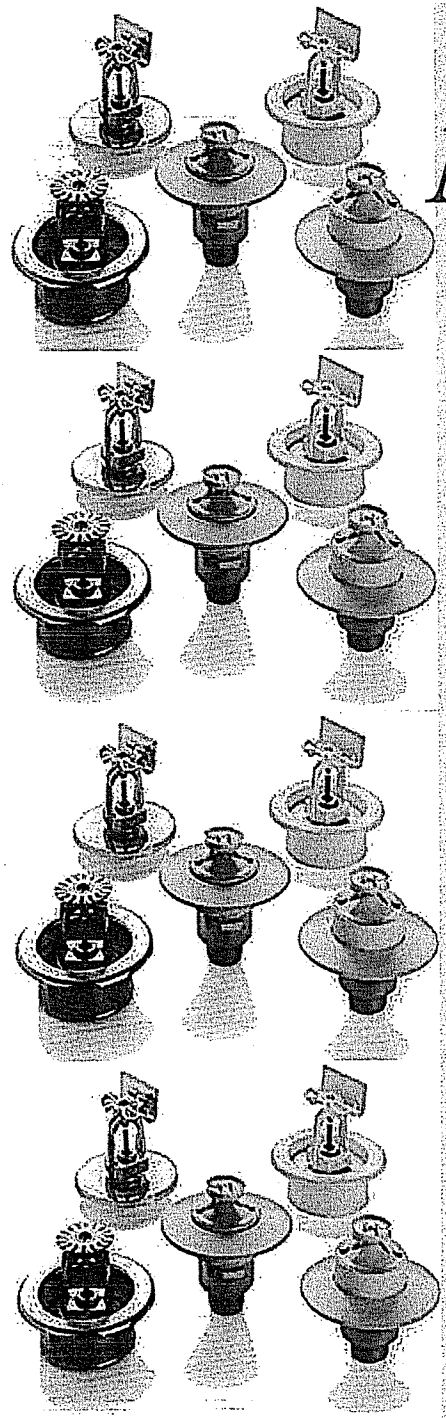
U.S. Firefighter Injuries by Property Type

- Majority of firefighter injuries occur in structure fires.
- Majority – 77% - occur in residences.
- 59% occur in 1- & 2- Family homes.
  - By far the most injuries occur here.

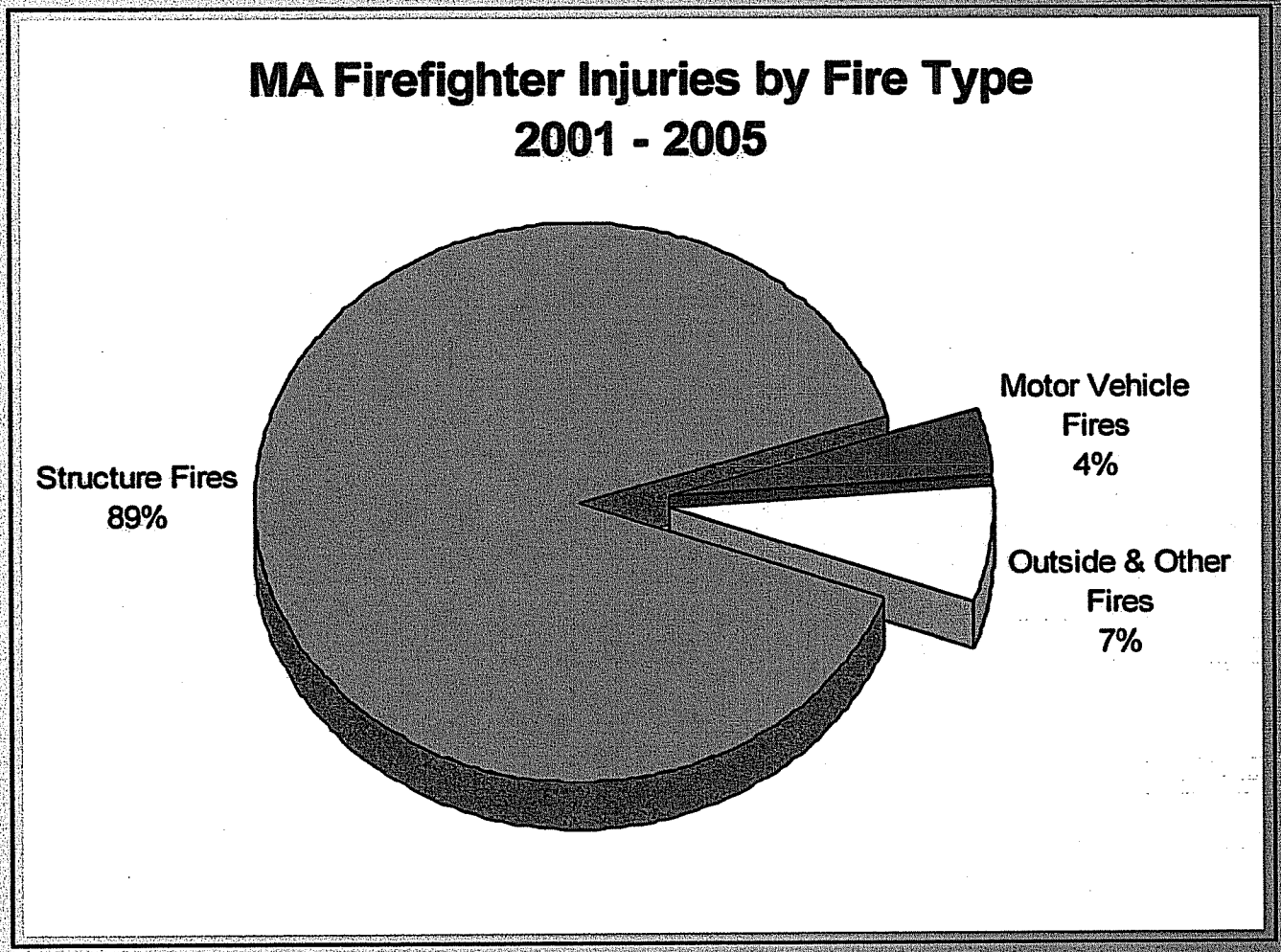


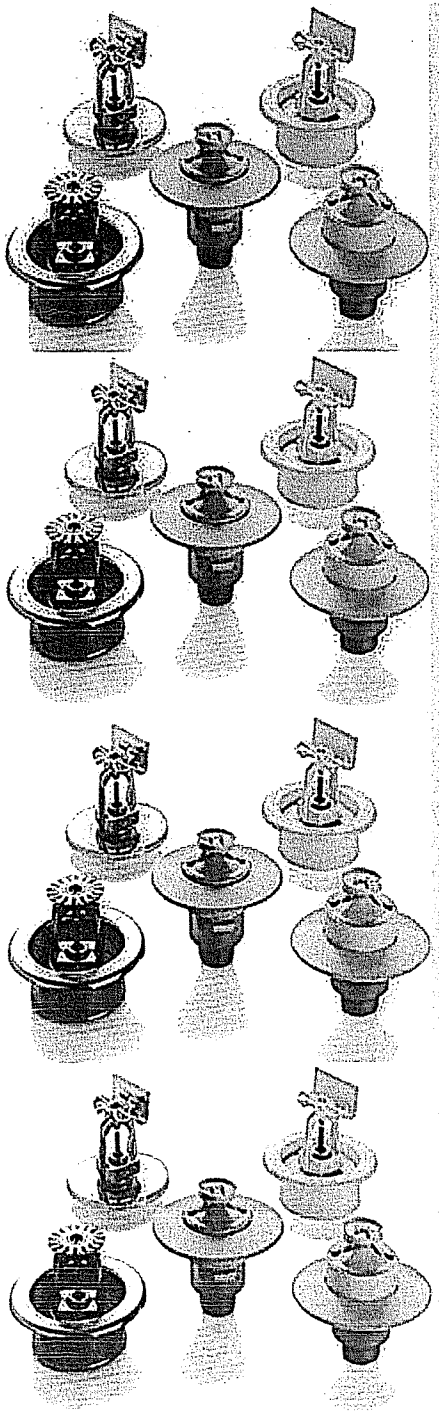
U. S. Firefighter Injuries by Property Type





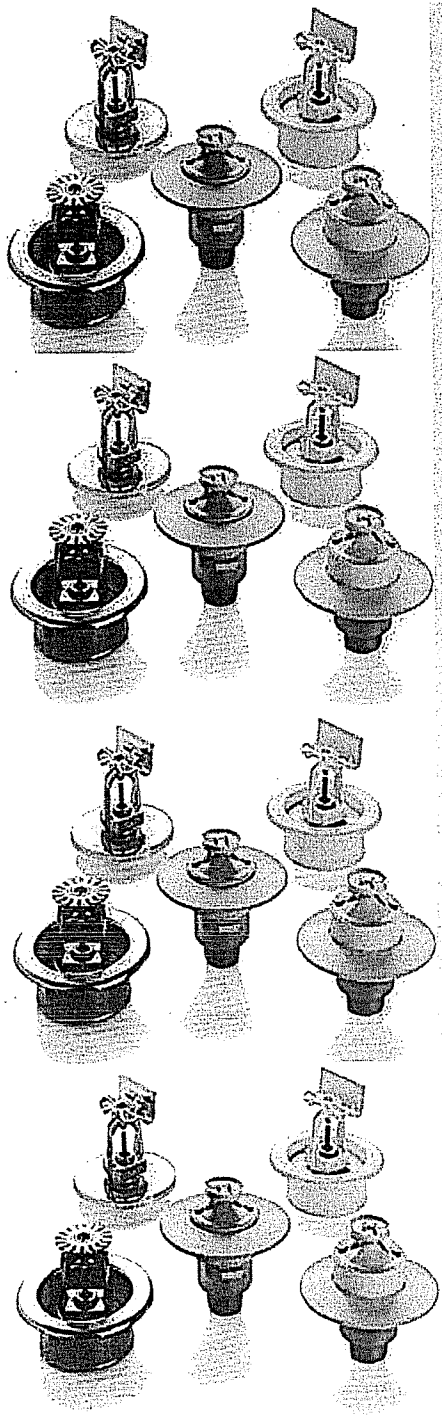
MA Firefighter Fire Injuries by Fire Type 2001 - 2005





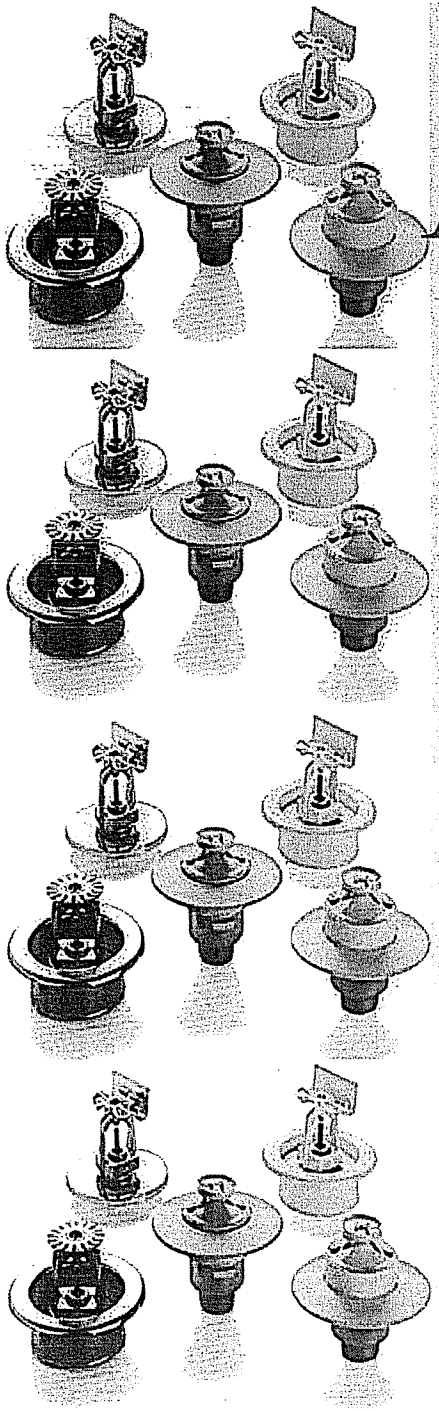
Cost to Municipalities

- Cost of Fire
  - Manpower, equipment
  - Surrounding towns
- Firefighter Injuries
  - Medical claims, replacement of personnel
- Firefighter Staffing Down
  - Overall responses up



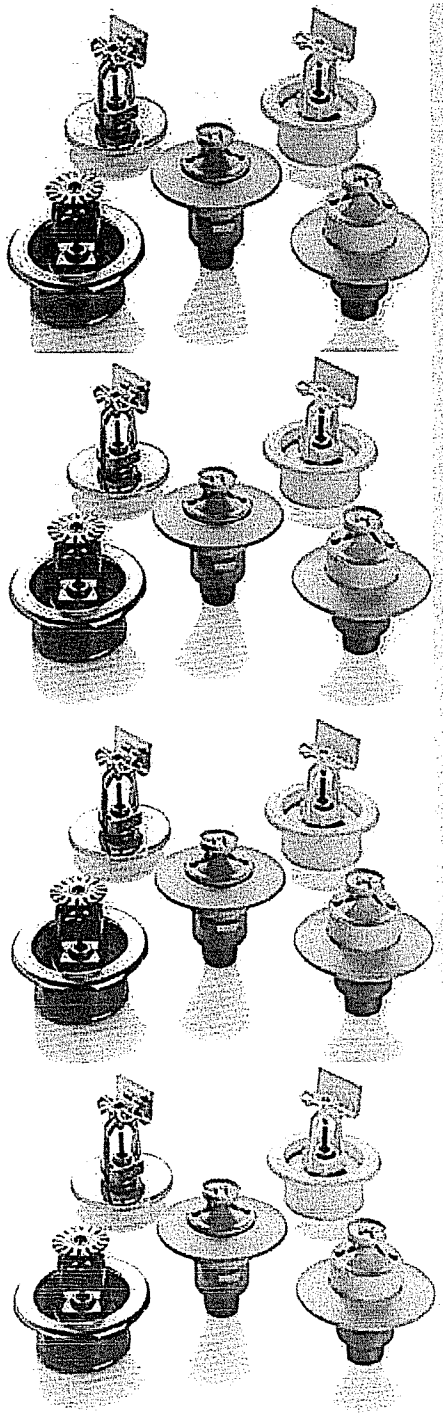
1- & 2-Family Fire Deaths

- Letter were sent to 213 cities & towns.
  - 139 replied = 65%
  - 74 did not reply = 35%
- We received responses on 429 fatal fires
  - Covered 76%, of the fatal fires
  - Accounting for 526, or 78%, of these deaths.



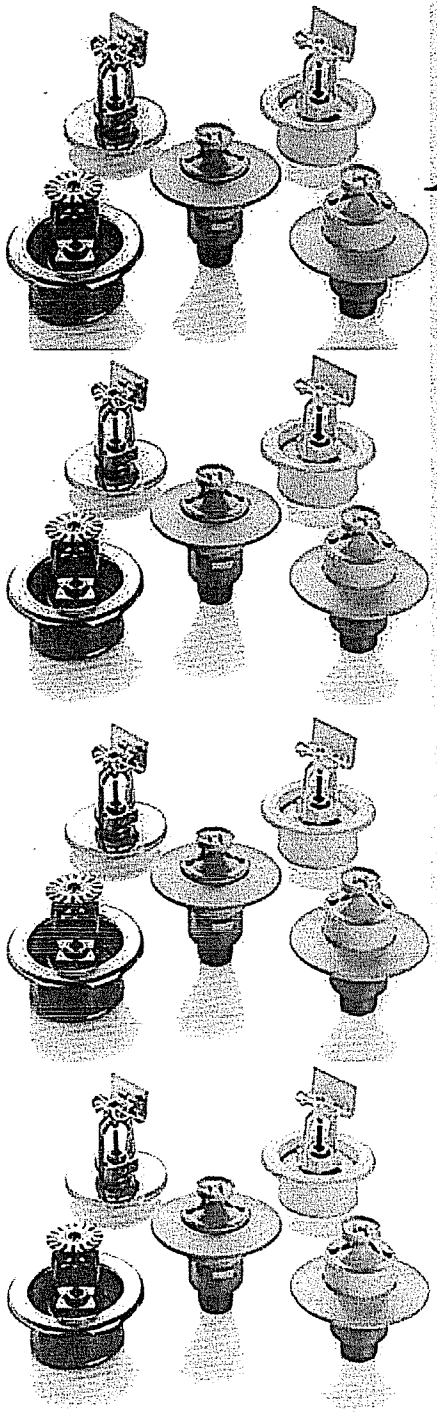
1- & 2-Family Fire Deaths

- Between 1986 – 2005 there were 561 fatal fires in 1- & 2-Family residences in MA.
  - 677 civilian fire deaths
  - 262 civilian injuries
  - 440 fire service injuries
  - $40.3 million in total damages



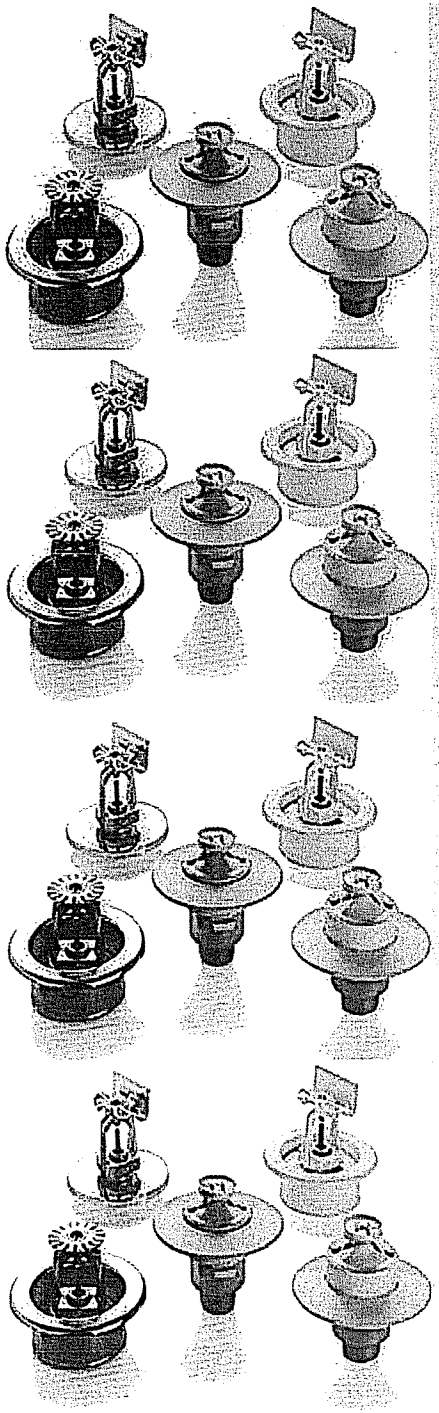
1- & 2-Family Fires 2001 - 2005

- There were 25,097 fires in 1- & 2-Family homes reported to MFIRS between 2001 – 2005.
  - 130 civilian deaths
  - 144 civilian injuries
  - 1,118 fire service injuries
  - $339 million in total dollar loss



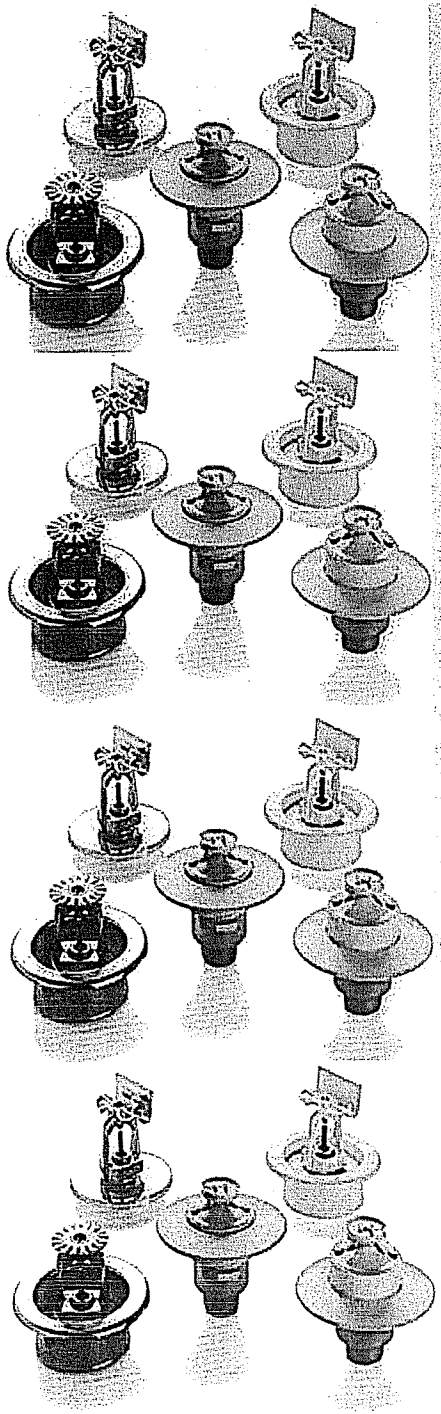
1- & 2-Family Fire Deaths in Homes Built After 1975

- Our research has concluded that 20 fatal fires have occurred in homes that were built after 1975.
  - 20 civilian fire deaths
  - 6 civilian injuries
  - 13 fire service injuries
  - 3+ % of fires with responses received are occurring in homes built after 1975



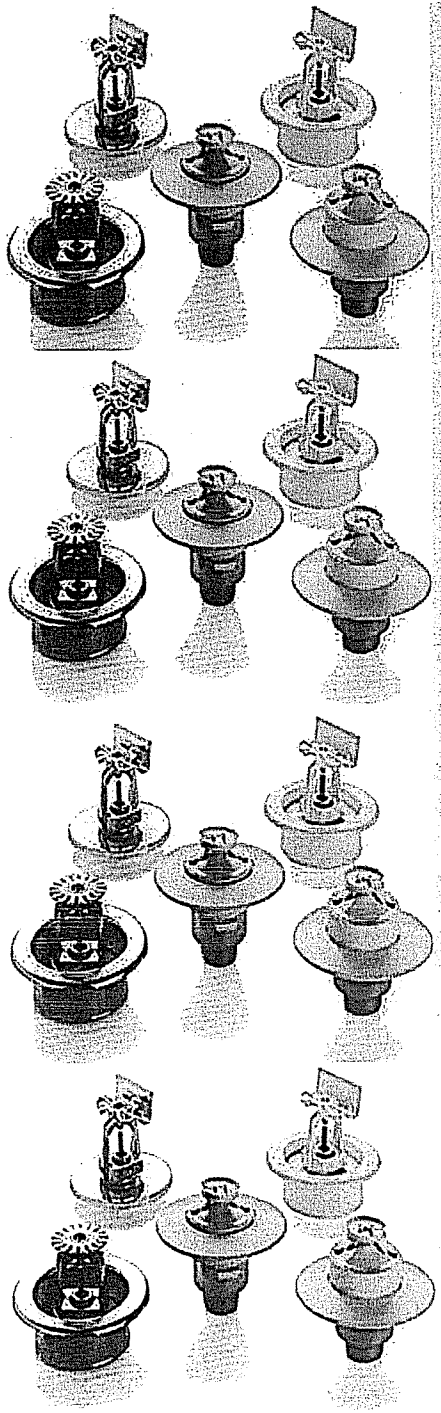
What's Next?

- People are dying in homes built under newer codes.
- More homes are built post 1975
  - Percentage will continue to increase
- What is an acceptable risk?
  - How many deaths a year are acceptable?



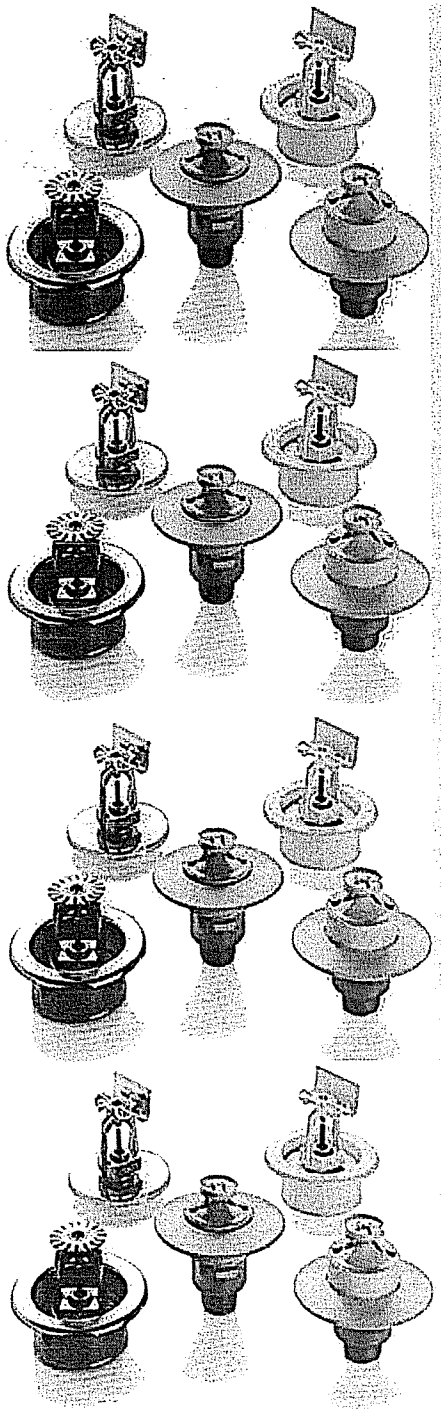
What's Next?

- Baby Boomers largest portion of generation
  - In many cases they will look to downsize
  - Stay in their homes longer



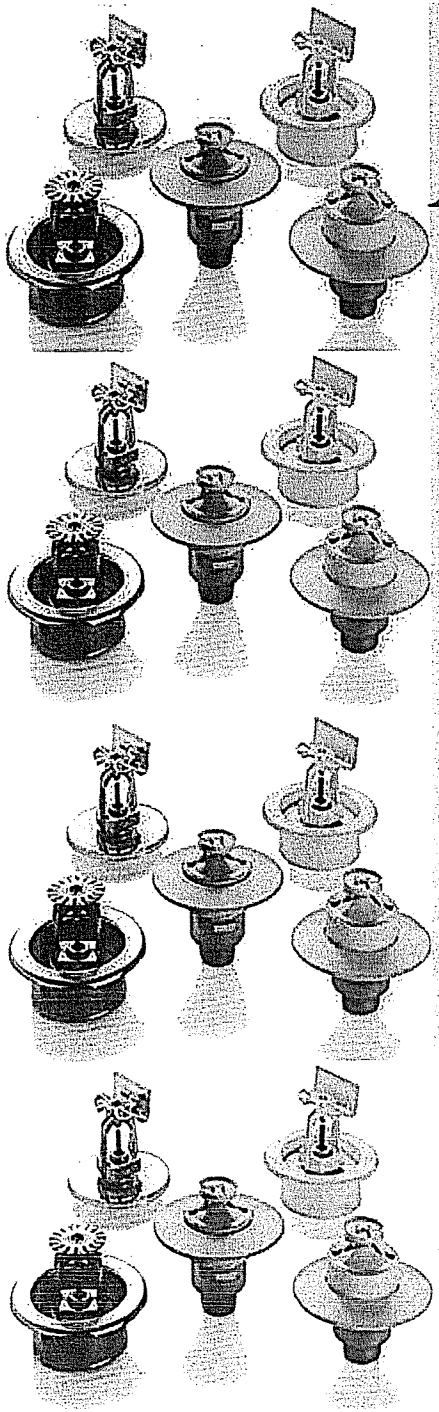
Recommended Goals of OTFRSC

- To identify the problem
  - Fatal fires
  - Injuries in fires
  - Cost of injuries and fatal fires
- Solve the problem
  - Public Education
  - Residential sprinklers
  - Cost of residential sprinklers



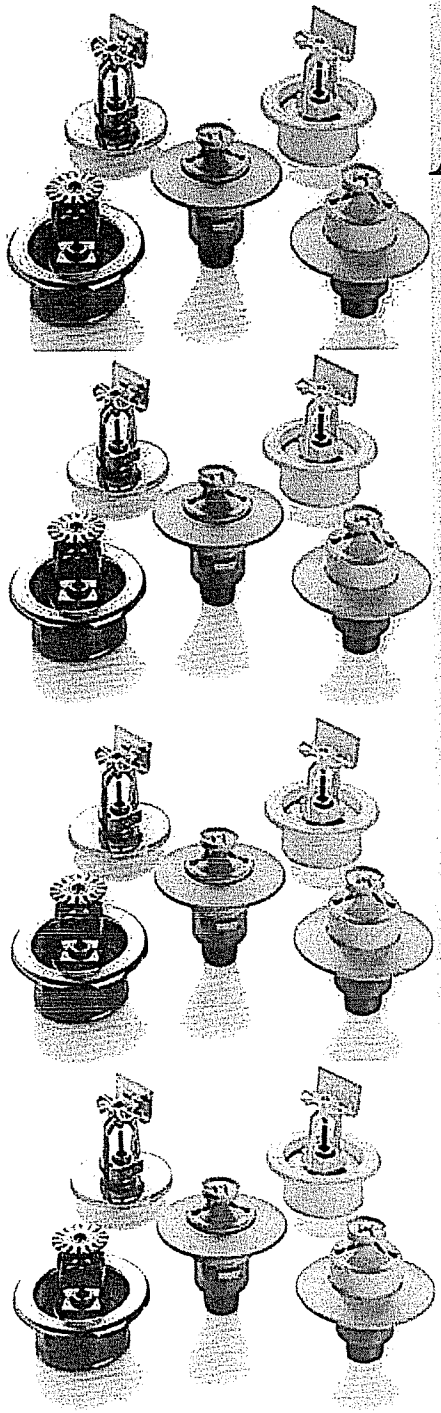
Recommended Goals of OTFRSC

- Goal:
  - Mandatory installation of residential sprinklers
- Identify the obstacles to goal
  - A low cost, and reasonable approach to the mandatory requirement of residential sprinklers.
- Work together to solution
  - Time is here!



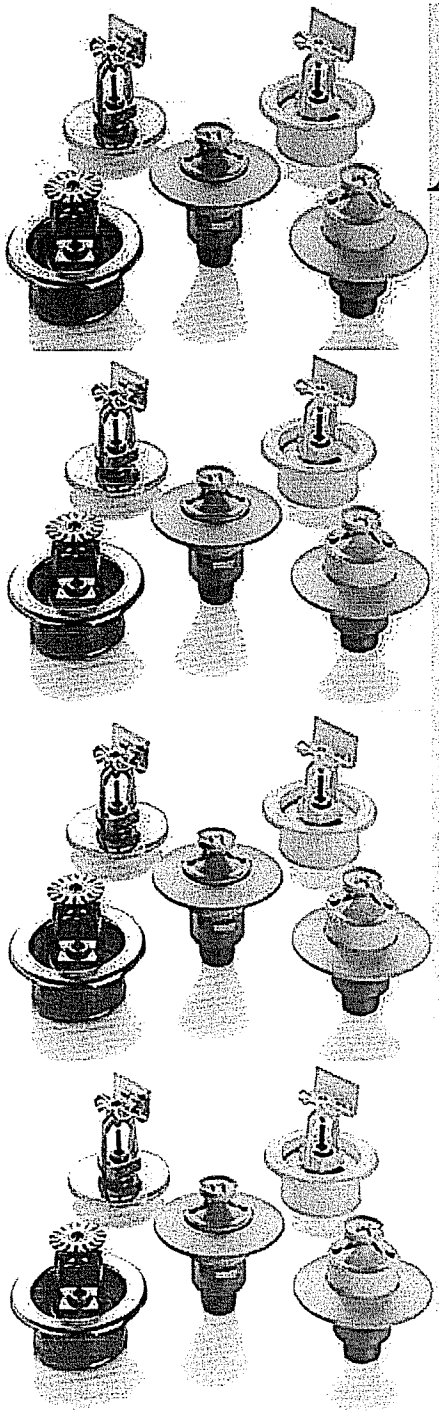
NAHB Research Center Report October 1995

- Conclusions
  - Residential sprinklers are technically reliable.
  - Home buyers recognition of economic value is low.
  - Market fails to recognize the cost of residential sprinklers
  - Project demonstrated that it is technically feasible to install at residential sprinkler system for $0.50 per square foot



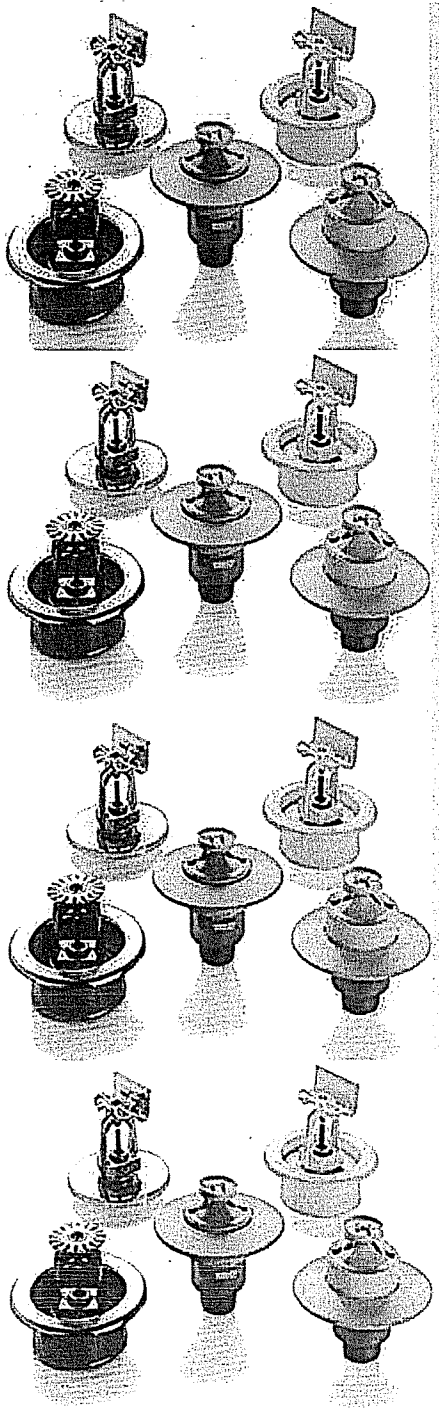
NAHB Research Center Report October 1995

- Conclusions continued
  - Sprinkler system has to be part of a combined domestic/fire plumbing system
  - Uncomplicated and easy to install
  - Many state and local requirements are based on commercial systems
    - Excessive when applied to one/two family homes



NAHB Research Center Report October 1995

- Recommendations
  - Education
  - Training
  - Disseminate Lessons Learned from the Barriers Report
  - Encourage Greater Competition
  - Involve Builders
    - Market acceptance will lead to lower costs and higher demand



1- & 2-Family Housing Units

- 2000 Census – 2,621,989 total housing units in MA.
  - 2007 estimate – 2,776,225 total housing units in MA.
- Since 1980 – 456,181 new 1- & 2-Family housing units approved in MA.
  - 16% of total current housing stock.

APPENDIX C-1

Sample "BUILDINGS FIRE FATALITIES SURVEY" – 2 Pages

BUILDINGS – FIRE FATALITIES SURVEY

ONE- AND TWO-FAMILY BUILDINGS WHERE DEATHS HAVE OCCURRED COINCIDENT w/a BUILDING FIRE

(Approximately 25 year Survey Period)

CITY OR TOWN		**STREET ADDRESS**	
DATE OF FIRE		**TOTAL NUMBER OF DEATHS IN BUILDING**	
AGES AND GENDER OF VICTIMS			
DETERMINED CAUSE(S) OF DEATHS			
ROOM OF ORIGIN OF FIRE (if known)			
TIME OF DAY OF THE FIRE	**DAYTIME**	**NIGHTTIME**	
WERE THE VICTIMS AWAKE OR ASLEEP (if known)?			
WERE ANY OF THE VICTIMS INTIMATE WITH THE FIRE AT TIME OF IGNITION (if known)?			
FLOOR LEVEL(S) WHERE DEATHS OCCURRED			
CAUSE OF FIRE (if known)?			
SINGLE FAMILY HOME	**YES or NO**	**TWO FAMILY HOME**	**YES or NO**
APPROXIMATE AGE OF HOME OR YEAR BUILT			

NUMBER OF OCCUPIED STORIES			
WOOD FRAME/WESTERN PLATFORM FRAMED	**YES or NO**	**WOOD FRAME/BALLOON FRAMED**	**YES or NO**
WOOD FRAME/BALLOON FRAMED w/KNOWN FIRESTOPPING	**YES or NO**	**OTHER THAN WOOD-FRAMED/DESCRIBE**	
BUILDING PERMIT ACTIVITY (prior to fire)			
ELECTRICAL SERVICE STATUS (what size Service; what wiring types, etc.)			
WIRING PERMIT ACTIVITY (prior to fire)			
SMOKE DETECTORS PRESENT?	**YES or NO**	**SMOKE DETECTORS OPERATING AT TIME OF FIRE? (if known)**	**YES or NO**
SMOKE DETECTORS / BATTERY-OPERATED?	**YES or NO**	**SMOKE DETECTORS / HARD-WIRED AND INTERCONNECTED?**	**YES or NO**
SMOKE DETECTORS / LOW-VOLTAGE SYSTEM TYPE?	**YES or NO**		
SMOKE DETECTOR TYPE(S)?	**Ionization?**	**Photoelectric?**	**Combination Ionization/Photoelectric?**
FIRE SPRINKLER SYSTEM PRESENT?	**YES or NO**	**FIRE SPRINKLER SYSTEM OPERATING?**	**YES or NO**
TYPE OF SPRINKLER SYSTEM PRESENT			
DOES THE COMMUNITY HAVE A REQUIEMENT THAT A SPRINKLER SYSTEM BE INSTALLED IN ONE- AND TWO-FAMILY DWELLINGS?	**YES or NO**		

APPENDIX C-2

"Fatal Fire Survey Responses Spreadsheet" – 1 Page

Fatal Fire Survey Responses Spreadsheet

City or Town	Date of Fire	Time of Fire	Cause of Fire	Victim Age	Victim Gender	Victim Awake/ Asleep	Victim Intimate w/ Fire	Cause of Death	Origin of Fire	One/Two Family Home	Approximate Age as Date or in Years	# of Stories	Type of Framing	Smoke Detectors Present	Smoke Detectors Operating	Power Source of Detectors	Type of Detector
Arlington	11/30/1987	--	Smoking Material	66	Female	Unknown	--	--	Bedroom	One	--	2	Wood framed	--	--	--	--
Arlington	6/21/1989	Morning	--	51	Female	Asleep	--	--	Bedroom	One	--	2	Wood framed	No	--	--	--
Arlington	1/3/1994	12:30	Smoking Material	71	Female	Unknown	--	--	Kitchen	One	--	2	Wood framed	--	--	--	--
Arlington	12/26/1995	17:11	Smoking Material	85, 85	M, F	--	--	--	Living Room	One	--	2	Wood framed	No	--	--	--
Blackstone	1/24/1994	21:55	Smoking Material	51	Female	Unknown	--	Burns/Smoke Inhalation	Kitchen	One	200	2	Western Platform	No	--	--	--
Blackstone	1/14/1998	10:04	Cooking	67	Male	Unknown	unknown	Burns/Smoke Inhalation	Kitchen	Two	--	2	--	Yes	Yes	Battery	Ionization
Braintree	1/1/1995	Night	Unknown	--	--	--	--	--	--	Multi	--	3	--	Yes	Yes	Hard-wired interconnected	--
Braintree	8/19/1997	06:30	Unknown	--	--	--	--	--	--	Multi	--	3	--	Yes	Yes	Hard-wired/ Battery	--
Braintree	--	Night	--	--	--	--	--	--	--	one	--	2	Western Platform	--	--	--	--
Brewster	1/16/1999	21:27	Improper Use of Coal Stove	56	Male	Unknown	Yes	--	Living Room	One	--	2	Western Platform	No	--	--	--
Brewster	2/19/2003	02:01	Cigarette	47	Female	Asleep	No	Smoke Inhalation	Sitting Room	One	1970	2	Western Platform	Yes		Battery	--
Brookline	12/19/1990	12:37	Pipe	88	Male	Asleep	Yes	Burns/Smoke Inhalation	Living Room	Two	1923	2	Western Platform	No	--	--	--
Burlington	11/7/1991	12:01	--	73	Male	Unknown	--	--	--	One	1960	1	Western Platform	--	--	--	--
Burlington	1/1/2005	02:48	Smoking Material	89	Male	Asleep	No	--	Screened Porch	One	1950	1 3/4	Balloon	Yes	Yes	Battery	--
Carver	2/20/1994	14:47	Electrical	unknown	unknown	Unknown	no	unknown	basement	One	1947	1	Log Cabin	Unknown	--	--	--
Carver	11/18/2003	00:27	Oxygen Tanks	--	--	--	No	--	Bedroom	One	1975	1	HUD	Unknown	--	--	--
Carver	3/1/2004	08:05	Plumber's Torch	unknown	unknown	Awake	Yes	unknown	Kitchen	One	1976	1	HUD	Unknown	--	--	--
Dover	4/24/1987	12:48	Stove	93	Male	Awake	unknown	Smoke Inhalation	Kitchen	One	--	2	Balloon w/ firestopping	Unknown	--	--	--
Dover	2/9/1995	22:00	Candle	62	Female	Awake	unknown	Smoke Inhalation	Family Room	One	28	2	Western Platform	Unknown	--	--	--
Duxbury	2/3/1994	09:27	Cooking	82	Female	Awake	Yes	Burns	Kitchen	One	pre 1950	2	Balloon	Yes	No	Battery	Photoelectric
Duxbury	10/16/2008	01:15	Unknown	84	Male	Asleep	No	Burns	Unknown	One	pre 1900	2	Western Platform	Yes	Yes	Battery	Photoelectric
Egremont	12/15/2001	22:55	Cigarette	34	Female	Asleep	unknown	Burns/Smoke Inhalation	--	One	--	1	--	Yes	No	Battery	--
Everett	12/27/1992	01:30	Christmas Tree	72	Female	Asleep	No	Smoke Inhalation	Living Room	One	1902	2	--	Yes	Yes	Battery	--
Everett	11/3/1996	22:55	Smoking Material	80	Female	Unknown	Yes	Burns/Smoke Inhalation	Living Room	Multi	1957	1	Western Platform	Yes	Yes	Battery	--
Everett	8/17/1999	01:33	Smoking Material	28	Male	Asleep	Yes	Burns	Bedroom	Two	1907	3	Balloon	Yes	Yes	Battery	--
Foxborough	12/17/1986	08:57	Woodstove Malfunction	37, 7, 5	F, M, F	Unknown	unknown	Smoke Inhalation	Basement	One	50±	1	Western Platform	No	--	--	--
Holbrook	12/28/1997	Night	Unknown	60+	Female	Asleep	unknown	unknown	Bedroom	Two	1920's	2	Balloon w/ firestopping	Yes	--	Battery	--
Holbrook	1/29/2000	Night	Unknown	60+	Male	Asleep	unknown		Living Room	One	1950's	1	--	Yes	--	Battery	--
Ludlow	11/9/1986	02:55	Smoking Material	10, 64, 27	Females	Asleep	unknown	Smoke Inhalation	Living Room	One	--	2	Balloon w/ firestopping	No	--	--	--
Merrimac	10/9/1988	10:00	Stove	unknown	Female	Awake	No	Burns	Kitchen	One	--	1	Manufactured Housing	Yes	--	Hard-wired interconnected	Ionization
Oak Bluffs	5/14/1987		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Quincy	10/23/1986	22:55	Unknown	2.5	Female	Asleep	unknown	Burns/Smoke Inhalation	Unknown	one	--	1	Unknown	--	--	--	--
Quincy	1/24/1991	22:24	Space heater	2, 5, 25	M, F, F	Asleep	yes	Burns/Smoke Inhalation	Bedroom	One	1880	2.5	Wood framed	Unknown	--	--	--
Quincy	6/12/1992	02:53	Smoking Material	39	Male	Asleep	yes	Burns	Basement Bedroom	One	1921±	3	Wood framed	Yes	--	Battery	--
Quincy	5/7/1996	08:31	Stove	88	Female	Awake	Yes	Burns/Smoke Inhalation	Kitchen	One	--	2	--	--	--	--	--
Quincy	1/12/1998	05:30	Fireplace ember on couch	93	Female	Unknown	no	--	basement	One	1949	3	Western Platform	--	--	--	--
Quincy	12/18/2001	09:10	Smoking Material	47	Female	Awake	Yes	Burns/Smoke Inhalation	Bedroom	One	1924	2	Wood framed	Yes	--	Hard-wired in basement	--
Quincy	12/15/2004	20:04	Gasoline/Candle	30	Female	Awake	Yes	Suicide	Bedroom	One	1920±	2.5	Western Platform	No	--	--	--
South Yarmouth	5/30/1997	00:29	Smoking Material	72	Male	Asleep	yes	--	Living Room	One	40	1	Balloon w/ firestopping	Yes	--	--	--
Swansea	12/26/1993	09:15	Candle	61	Female	Unknown	unknown	--	Bedroom	One	40	2	Western Platform	No	--	--	--
West Yarmouth	6/1/2000	04:36	Smoking Material	35	Male	Asleep	Yes	--	Living Room	One	30	1	Western Platform	--	--	--	--
West Yarmouth	3/19/2001	19:58	Toaster	42	Male	Awake	No	--	Kitchen	Two	30	1	Western Platform	Yes	--	Battery	Ionization
West Yarmouth	4/8/2008	00:38	Smoking Material	47	Female	Unknown	no	--	Kitchen	One	30±	--	Western Platform	--	--	--	--
Yarmouth	7/1/2000	06:22	Smoking Material	74	Female	Asleep	Yes	Smoke Inhalation	Living Room	Multi	< 20	2	Western Platform	Yes	--	--	Ionization

1. Hyphens appear where no information was provided or the answer was "unknown"
2. All survey responses had no sprinkler systems present or required
3. There was no significant information provided in terms of Electrical wiring

APPENDIX D-1

Sample "SURVEY OF PRACTICES RELATIVE TO THE INSTALLATION OF ONE- AND TWO-FAMILY RESIDENTIAL FIRE SPRINKLERS" – 5 Pages

Deval L. Patrick
Governor

Timothy P. Murray
Lieutenant Governor

The Commonwealth of Massachusetts
Department of Public Safety
Board of Building Regulations
and Standards
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Kevin M. Burke
Secretary

Thomas G. Gatzunis, P.E.
Commissioner

SURVEY OF PRACTICES RELATIVE TO THE INSTALLATION OF ONE- AND TWO-FAMILY RESIDENTIAL FIRE SPRINKLERS

December 29, 2008

Ladies and gentlemen:

The State Board of Building Regulations and Standards (BBRS) is the state board empowered to promulgate the Massachusetts State Building Code (780 CMR).

The BBRS has been asked to consider amending the Building Code to require residential sprinklers in all new construction one- and two-family homes in the State.

Tasked to assist the BBRS in this matter, the BBRS has created the ONE AND TWO FAMILY RESIDENTIAL SPRINKLER COMMITTEE (OTFRSC).

The BBRS and the OTFRSC understand and respect that the numerous Community Public Water System Providers/Water Purveyors providing *Drinking Water* to one- and two-family dwellings, across the Commonwealth, have various requirements to protect the local water supply.

To better ascertain what municipal installation and maintenance requirements may exist across the Commonwealth that affect the design, installation and testing and maintenance of **one- and two-family residential fire sprinkler systems**, the BBRS, through the OTFRSC, is seeking your responses to a small family of questions contained in the attached Survey.

If you are able to respond to this Survey, we seek response no later than the end of January, 2009 and please forward your responses (e-mail preferred) to:

tom.riley@state.ma.us

or by FAX to Tom Riley @ 617- 248 – 0813

or by mail to:
Department of Public Safety
One Ashburton Plc., Room 1301
Boston, MA 02108
Attn.: Tom Riley

The BBRS and OTFRSC deeply appreciate your consideration relative to the attached Survey and should you have any questions, please contact me at any time (tom.riley@state.ma.us or 617-727-3200, x25250).

Sincerely,

Thomas M. Riley
Department of Public Safety
Code Development Manager

- Please see Survey (a Family of 8 Questions) on the following pages -

SURVEY QUESTIONS REGARDING COMMUNITY PUBLIC WATER SYSTEM PROVIDERS/WATER PURVEYOR REQUIREMENTS RELATIVE TO THE DESIGN, INSTALLATION, TESTING AND MAINTENANCE OF ONE- AND TWO-FAMILY RESIDENTIAL FIRE SPRINKLERS

BACKGROUND INFORMATION

National Fire Protection Association Standard NFPA 13D is the building life safety Sprinkler Design and Installation Standard for One- and Two-Family Residential Fire Sprinkler Systems and NFPA 13D does permit (but not require) that the NFPA 13D Sprinkler System water line from the street also be allowed shared with the potable water system; i.e., a single water line from the street to the home.

SURVEY QUESTIONS

1a. **Name and Contact Information of Community System Provider** • Name • e-Mail Address • Phone Number	**NAME:** **e-Mail Address:** **Phone Number:**
1b. **What type of Provider are you?** • A Municipal Water Department? • A Commission? • A Water District • A Private Water Company?	**MUNICIPAL WATER DEPARTMENT _____** **COMMISSION _____** **WATER DISTRICT _____** **PRIVATE WATER COMPANY _____**

2a. Does your community require that the residential fire sprinkler system be separate from the potable water system?	**YES** _____ **NO** _____
2b. If the answer to **2a.** is ***YES***, could you explain WHY a separate fire main is required.	**WHY IS A SEPARATE FIRE MAIN REQUIRED?**
3. Is a single water meter allowed for both the potable and residential fire sprinkler systems?	**YES** _____ **No** _____
4. Is a Water Utility-approved Drain Layer required to lay the water line from the street to the dwelling even when the water line is for or is shared with a residential fire sprinkler system?	**YES** _____ **No** _____
5a. What Test Standards are used to flush the incoming waterline?	**IDENTIFY ANY NATIONALLY-RECOGNIZED TEST STANDARDS OR LOCALLY-REQUIRED METHODS.**
5b. Who conducts the Tests described in **5a.?**	**IDENTIFY THE PERSON WHO CONDUCTS SUCH TESTS (i.e., the Utility-approved Drain layer or Other and if Other, who?).**
5c. Is the line used for the residential fire sprinkler system flushed?	**YES** _____ **No** _____
5d. If the answer to **5c.** is YES, who flushes this line?	**IDENTIFY THE PERSON WHO FLUSHES THE FIRE MAIN (i.e., the Utility-approved Drain layer or Other and if Other, who?).**

<table>
<tr><td>5e. What water pressures and flow rates are used to flush the incoming fire sprinkler main?</td><td><u>SIZE PIPE</u> <u>GPM</u> <u>PRESSURE</u>
¾ “

1”

1 ½”

2”</td></tr>
<tr><td>6. What are the fees associated with a second water line (residential fire sprinkler main)?</td><td>
<table>
<tr><th>FEE TYPE</th><th>COST for ¾ inch Fire Main</th><th>COST for 1 inch Fire Main</th><th>COST for 1 1/2 inch Fire Main</th><th>COST for 2 inch Fire Main</th></tr>
<tr><td>Basic Charge?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Water Development Charge?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Cost/ft. of Fire Main?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Fire Protection Fee?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Other?</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>7a. What type of backflow prevention is required of the residential fire sprinkler system?</td><td>DESCRIBE BACKFLOW PREVENTION REQUIRED.</td></tr>
<tr><td>7b. Are any periodic tests of the residential fire sprinkler system backflow prevention device required and if so, what is the frequency of such testing and the fees associated with such testing?</td><td>DESCRIBE SUCH TESTS AND THE REQUIRED FREQUENCY OF THESE TESTS.

WHAT FEES ARE ASSOCIATED WITH THESE REQUIRED TESTS?</td></tr>
<tr><td>8. Above and beyond Question 6 above, does the Department / Commission / District/Company impose any additional requirements or fees relative to residential fire sprinkler systems?</td><td>PLEASE DESCRIBE ANY ADDITIONAL REQUIREMENTS AND/OR FEES.</td></tr>
</table>

APPENDIX D-2

"Water Purveyor General Response" spreadsheet – 1 Page

Water Purveyor General Responses

City or Town	Municipal Water Dept.	Water Commission	Water District	Private Water Co.	Fire sprinkler system separate from potable water system?	If YES Why?	Is a single water meter allowed for potable + Fire sprinklers?	Is an approved Drain layer required the water line?	What Test Standards for flushing water line?	Who conducts the flushing?	Is the fire sprinkler system flushed?	Who flushes the fire sprinkler system?	What water pressure to flush the fire sprinkler main?
Grafton			YES		YES	Active Fire Protection	NO	YES	Flushed/chlorinated	Water Operator	YES	Water Operator	10 gpm @ 21
Sandwich				YES	YES	Protect water quality	NO	YES	AWWA	Water Operator	YES	Water Operator	300 gpm @ 60 psi
Worcester	Yes				No	N/A	NO	YES	Worcester Fire Dept. Standards	Utility approved drain layer	YES	Utility approved drain layer	use NFPA guidelines
Swansea			Yes		No	N/A	Yes	No	N/A	Swawsea water district service man	Yes	Swansea water district service man	N/A
Buzzards Bay			Yes		No	N/A	N/A	Yes	AWWA	Installer under supervision	Yes	Installer under supervision	75gpm/65 to 85 psi
Barre	Yes				No	N/A	No	Yes	N/A	N/A	No	N/A	N/A
Weston	Yes				Yes	Billing purposes	No	Yes	Town Standards	town-approved water contractor	Yes	town-approved water inspector	N/A
Pepperell	Yes				No	N/A	No	Yes	AWWA	Water Works testing company	Yes	Town of Pepperell Water dept.	pressure varies
N/A	Yes				Yes	Protect water quality	Yes	Yes	N/A	N/A	No	N/A	N/a
Palmer			Yes		N/A	N/A	N/A	Yes	Flushing test	Water District Staff	Yes	Water District Staff	full bore flow and throttled flow
Woburn	Yes				Yes	No restrictions from residential use on fire use	No	No	AWWA, chlorination and pressure tests	Water Dept. oversees contractor	Yes	Water Dept. oversees contractor	all above 20 psi
Chelmsford			Yes		No	N/A	Yes	No	Flushed during annual inspection	private contractor	Yes	Private Contractor	N/A
Boston		Yes			Yes	Fire Protection	No	Yes	N/A	N/A	No	N/A	water pressures vary throughout city
Merrimac	Yes				Yes	Protect water quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Newton	Yes				No	N/A	Yes	Yes	Flush test	Utility Crew	Yes	Plumber	N/A
Orange	Yes				No	N/A	Yes	Yes	N/A	N/A	N/A	N/A	N/A
Lunenburg			Yes		Yes	Antifreeze would contaminate potable water	Yes	No	flushed upon installation at max flow	Water Dept.	No	N/A	minimum of 2.5 feet/second
West Boylston			Yes		No	N/A	Yes	Yes	water is flushed at normal system pressure	Water District Operator	Yes	Water District Operator	N/A
Springfield		Yes			Yes	To protect and control domestic water, town laws	No	Yes	AWWA C-600, C-651, bacterial testing	Commisson approved contractor	Yes	Commisson approved contractor	40 to 120 psi
Haverhill	Yes				No	N/A	No	No	New lines are flused to remove debris	Water Dept. employees	Yes	Water Dept. employees	system pressure is used for all sizes
Dunstable	Yes				No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Attleboro	Yes				Yes	To ensure adequate flow	N/A	Yes	AWWA, chlorination	Utility approved drain layer	Yes	Utility approved drain layer	Varies
Melrose	Yes				No	N/A	Yes	Yes	AWWA	Grade 3D Licensed professional	No	N/A	N/A
New Bedford	Yes				Yes	Public safety, department policy	No	Yes	AWWA, test pressure and chlorination	Utility approved drain layer	Yes	Utility approved drain layer	N/A
Brookline													
Lawrence	Yes				Yes	Protect water quality, billing purposes	No	Yes	AWWA	Contractor overseen by Water Dept.	Yes	Contractor overseen by Water Dept.	N/A
Wareham			Yes		Yes	Fire requires greater flow rate than domestic	No	Yes	MFPA 13R, 780 CMR 903.3.1.2	Installer overseen by Water Dept.	Yes	Water Dept. technician	Static system pressure at full flow for each size
Whitinsville				Yes	No	N/A	N/A	No	flushed upon installation	Utility personel	Yes	Utility personel	System pressure varies
Plymouth	Yes				Yes	Control potable water service, prevent cross connections	No	No	tested to 200 psi for 2 hours without leakage	Owner of property overseen by inspector	Yes	The town	static system pressure flushed at full rate
Northborough	Yes				Yes	To protect potable water	Yes	Yes	Typical water line flushing	Approved water tester	No	N/A	2x system pressure or 200#
Marlborough	Yes				No	N/A	Yes	Yes	AWWA	Contractor overseen by City Inspector	N/A	N/A	N/A
Littleton	Yes				N/A	N/A	Yes	No	AWWA	Contractor or his agent	Yes	Water Utility	minimum standards required by fire sprinkler company
South Grafton			Yes		Yes	For billing purposes and prevention of cross connection	No	Yes	AWWA	Certified Tester	Yes	SGWD Representative	80 psi
Milton	Yes				Yes	Water quality concerns	N/A	Yes	AWWA	Independent company	Yes	Utility approved company	N/A
Leicester			Yes		Yes	Water quality, separation of backflow protection	No	Yes	Drainlayer	Fire Sprinkler Co./Plumber	Yes	Fire Sprinkler Co./Plumber	varies
Lynn		Yes			Yes	So shut-off for non-payment doesn't affect fire water	No	Yes	N/A	Drainlayer	N/A	N/A	N/A
Duxbury	Yes				No	N/A	Yes	Yes	N/A	Qualified inspector not paid for by town	Yes	Licensed fire sprinkler inspector	Determined by licensed sprinkler inspector
Southbridge	Yes				Yes	For billing and protection of domestic water quality	No	Yes	AWAA	Outside contractor approved by dept.	N/A	Utility employee	N/A
Three Rivers			Yes		Yes	For billing purposes and service work separation	No	No	Flush, flow, and pressure tests	MA certified testers	N/A	N/A	N/A
Devens	Yes				No	N/A	No	No	N/A	N/A	N/A	N/A	N/A
Northampton	Yes				No	N/A	No	No	AWWA	Contractor overseen by Water Dept.	Yes	Contractor overseen by Water Dept.	Varies
Acton			Yes		No		Yes	No	None	N/A	No	N/A	N/A
Shirley			Yes		No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Foxborough		Yes			No	N/A	No	Yes	AWWA	Water Dept.	Yes	Water Dept.	N/A
Huntington	Yes				No	N/A	No	No	NFPA	Do not have any	No	N/A	N/A
Dennis			Yes		No	N/A	N/A	N/A	AWAA	The utility	Yes	The Utility	Varies

1. See two additional spreadsheets Appendices D-3 and D-4 for additional Water Purveyor Responses

APPENDIX D-3

Water Purveyor Backflow Preventer Response Spreadsheet" – 1 Page

Water Purveyor Backflow Preventor Response Spreadsheet

City or Town	DCVA	RPZ	DCVA Test Frequency	RPZ Test Frequency	DCVA Test Cost	RPZ Test Cost
Acton	Yes	Yes	--	--	50	50
Attleborro	Yes	Yes	once/yr	twice/yr	65	65
Barre	--	--	twice/yr	twice/yr	100	100
Boston	Yes	--	once/yr	--	110	110
Buzzards Bay	Yes	Yes	once/yr	twice/yr	55	55
Chelmsford	--	Yes	--	--	--	--
Dennis	Yes	Yes	once/yr	twice/yr	50	50
Devens	Yes	--	--	--	--	--
Dunstable	--	--	--	--	--	--
Duxbury	--	Yes	--	twice/yr	0	0
Foxborough	Yes	--	once/yr	--	80	--
Grafton	--	--	twice/yr	twice/yr	40	40
Haverhill	Yes	--	once/yr	--	35	35
Huntington						
Lawrence	Yes	Yes	once/yr	twice/yr	50	50
Leicester	--	Yes	--	--	--	--
Littleton	--	--	--	--	50	50
Lunenburg	--	Yes	--	twice/yr	--	--
Lynn	Yes	Yes	once/yr	twice/yr	30	30
Marlborough	--	--	--	--	--	--
Melrose	No	No	--	--	--	--
Merrimac	--	--	--	--	--	--
Milton	Yes	Yes	once/yr	twice/yr	50	50
New Bedford	Yes	Yes	twice/yr	twice/yr	150	150
Newton	Yes	Yes	once/yr	twice/yr	95	95
Northampton	Yes	--	once/yr	--	75	--
Northborough	--	--	once/yr	once/yr	--	--
Orange	Yes	--	--	--	--	--
Palmer	Yes	--	--	Mass DEP	0	0
Pepperell	--	--	--	Mass DEP	65	65
Plymouth	Yes	--	once/yr	--	50	
Sandwich	Yes	Yes	once/yr	twice/yr	55	55
Shirley	--	--	--	--	--	--
South Grafton	Yes	Yes	once/yr	twice/yr	35	35
Southbridge	--	--	--	--	--	--
Springfield	Yes	Yes	--	--	0	0
Swansea	Yes	Yes	once/yr	twice/yr	55	55
Three Rivers	Yes	Yes	once/yr	twice/yr	75-100	75-100
Wareham	Yes	Yes	once/yr	once/yr	75	75
Wellesley	--	Yes	twice/yr	twice/yr	50	50
West Boylston	No	No	--	--	0	0
Weston	Yes	Yes	once/yr	twice/yr	75	75
Whitinsville	Yes	Yes	once/yr	twice/yr	75	75
Woburn	Yes	--	--	--	36	36
Worcester	--	--	--	--	86	86

APPENDIX D-4

"Water Purveyor Response on Fire Sprinkler Costs" spreadsheet – 1 Page

Water Purveyor Response on Fire Sprinkler Costs

(See separate spreadsheet for backflow prevention costs)

City or Town	Cost for a 3/4" fire main	Cost for a 1" fire main	Cost for a 1 1/2" fire main	Cost for a 2" fire main	Water Development Charge	Cost/ft. of fire main	Fire protection fee	Other fee
Acton	--	--	--	--	--	--	--	--
Attleboro	300	300	300	300	--	--	--	--
Barre	--	--	--	--	--	--	--	--
Boston	150	150	150	150	150	--	.91/ day	--
Buzzards Bay	--	--	--	--	1,575	--	300/ yr	--
Chelmsford	66.60	95.60	115.60	137.60	2,500, 3,500	--	--	--
Dennis					0	6.1	100	
Devens	--	--	--	--	--	--	--	--
Dunstable	--	--	--	--	--	--	--	--
Duxbury	--	--	--	--	--	--	--	--
Foxborough	2300	2400	2450	2500			30-80	
Grafton	N/A	2500	2500	2500	--	--	--	--
Haverhill	--	--	--	--	--	--	--	--
Huntington				N/A				
Lawrence	--	100	150	200	100, 150, 200	--	100/yr	50 backflow test
Leicester	N/A	1500	2000	2500	3500	--	150/quarter	--
Littleton	--	--	--	--	2,500, 3,750, 5,000	--	--	25 initial set up inspection
Lunenburg	--	--	--	--	--	--	--	--
Lynn	300	300	300	300	--	--	--	--
Marlborough	--	--	--	--	--	--	--	--
Melrose	25	25	25	25	--	--	--	--
Merrimac	--	--	--	--	--	--	--	--
Milton	750	1,000	1,500	2,000	2,500	--	--	--
New Bedford	75	75	75	75	--	4/ft	--	450 permit
Newton	--	--	--	--	--	200, 225	150	--
Northampton	--	--	--	200	--	--	--	$65 application
Northborough	--	--	--	--	--	--	--	285 main tie in 4200betterment amount
Orange	--	--	--	--	--	--	--	--
Palmer	--	--	--	--	--	--	--	--
Pepperell	--	--	--	--	2,927, 9,367	--	--	--
Plymouth	--	650	850	950	--	--	64	--
Sandwich	--	--	--	--	--	--	--	--
Shirley	--	--	--	--	--	--	--	--
South Grafton	1/head/yr	1/head/yr	1/head/yr	1/head/yr	--	--	--	--
Southbridge	not allowed	2,000	2,400	4,000	--	--	80/qtr 166.19/ qtr	--
Springfield	not allowed	50	50	50	2000	--	2"-3.33/month, 4"-20.33/month	Tapping Main-310
Swansea	--	--	--	--	--	--	--	--
Three Rivers	--	--	--	--	--	--	200/ thousand gallons	--
Wareham	--	--	--	--	1,477.22	--	56.42/yr	75 backflow test
Wellesley	--	--	--	--	--	--	--	--
West Boylston	N/A	3,450	N/A	5,175	1,725	--	--	--
Weston	750	1000	1500	2000	0	0	0	200 fire flow test
Whitinsville	2,700	4,500	9,000	14,400	--	--	142.54/ quarterly	--
Woburn	500	500	500	500	--	--	--	--
Worcester	175	175	360	360	--	--	89/inch of pipe size	--

1. Additional Informal Reporting Suggests Annual Fees as High as $1000/year, in perpetuity

APPENDIX E

HBAM, Inc. "OTFRSC MA SPRINKLER SYSTEM COST ANALYSIS" – 6 Pages

Home Builders Association of Massachusetts, Inc.
124 Washington St - Suite 300
Foxborough, MA 02035

Tel. 508-543-6119 Fax 508-543-3382 email: ldonato@hbama.com www.hbama.com

OTFRSC
MA Sprinkler System Cost Analysis

Average cost of sprinkler system to homeowner 2007	13,575	
Average cost per SF of sprinkler system to homeowner 2007	4.02	
Cost of sprinkler system as % of $550,000 sales price $13574 / $550,000	2.47%	
Cost of sprinkler system for a home sold in 1977 for $54,000 $54,000 x 2.47%	1,333	
Average cost of sprinkler system 1976 - 2008 $1,333 + $13,575 = $14908 / 2	7,454	
Assume an average cost per unit for units built between 1975 & 2007	7,454	
Cost to owner $7,454 @ 6% for 25 years	48.00	per mo
	12	mos per Year
	25	years
Actual cost to owner	14,400	
Total # of housing units built 1976 -2005	502,040	
Actual cost to owner per unit	14,400	
Cost of sprinklers to home owners in MA	7,229,376,000	
Number of deaths in homes with smoke detectors 1986 -2005 (assumes smoke detector's were working in all homes with fire deaths)	16	
Average # of deaths per year	0.80	
Estimated Deaths per year 1976 - 1985 .8 X 10 years Note this # should be higher than actual deaths because there were fewer housing units	8	
Total deaths 1976 - 2005 (16 + 8)	24	
Cost of sprinklers per life saved	301,224,000	

Assumes smoke detectors working in all homes with fire deaths
Assumes sprinklers will prevent all fire deaths

8/29/2009

OTFRSC
MA Sprinkler System Cost Analysis

Average cost of sprinkler system

Location	Cost of sprinkler system	Cost per SF
North Andover	6,802.43	2.52
Westfield	14,341.68	4.98
Methuen	9,473.40	2.37
Mashpee	23,680.87	6.23
Average cost per unit	13,574.59	4.02

Sprinkler Cost Information

Project Location	North Andover	Average SF
Single Family or Condo	Single family detached condo's	2,700

Item	Comment	Cost
Was separate water line required	No	
Any additional municipal fees	No	
Backflow preventer	Yes / included in sprinkler cost	
Site work for additional water line	None required	
Storage tank & pump	Not required	
Sprinkler system	Per unit	5,000.00
Any additional hard costs	Flow test & wire outside alarm	170.00
Total hard costs		5,170.00
Broker's commission	5% of sales price	271.94
Builder's O&P	20% of sales price	1,360.49
Cost to homeowner		**6,802.43**

Description of system

We use plastic pipe within the home including the basement and steel pipe to heads in the garage.
The basement requires more lines with heads if we use plastic pipe rather than black iron.
This required lengthy negotiations with the fire department, to go from steel to plastic in the basement.
We are not required to have a storage and pump system because we had adequate water volume and pressure.

OTFRSC
MA Sprinkler System Cost Analysis

Sprinkler Cost Information

Project Location	Westfield	Average SF
Single Family or Condo	Single family	2,880

Item	Comment	Cost
Was separate water line required	No / onsite well	
Any additional municipal fees	No	
Backflow preventer	No	
Site work for additional water line	None required	
Storage tank & pump	Yes	1,450.00
Sprinkler system	Per unit	8,950.00
Any additional hard costs	Wiring for tank pump and alarm bell	500.00
Total hard costs		10,900.00
Broker's commission	5% of sales price	573.34
Builder's O&P	20% of sales price	2,868.34
Cost to homeowner		**14,341.68**

Description of System

OTFRSC
MA Sprinkler System Cost Analysis

Sprinkler Cost Information

Project Location	Methuen	Average SF
Single Family or Condo	Single family	4,000

Item	Comment	Cost
Was separate water line required	No / onsite well	
Any additional municipal fees	No	
Backflow preventer	No	
Site work for additional water line	None required	
Storage tank & pump	Yes	1,200.00
Sprinkler system	Per unit	6,000.00
Any additional hard costs		
Total hard costs		7,200.00
Broker's commission	5% of sales price	378.72
Builder's O&P	20% of sales price	1,894.68
Cost to homeowner		**9,473.40**

Description of System

System built to NFPA13 requirements, basement black iron pipe, all other piping Schedule 40 PVC, glycol mix for freeze protection, expansion tank to minimize potential pressure variations in in standy mode, fire dept bib located outside so they can hook up to it and re-charge the system if needed

OTFRSC
MA Sprinkler System Cost Analysis

Sprinkler Cost Information

Project Location	Mashpee	Average SF
Single Family or Condo	Single family	3,800

Item	Comment	Cost
Was separate water line required	yes	1,500.00
Any additional municipal fees	Water line permit	200.00
Backflow preventer	Yes, yearly inspection	50.00
Site work for additional water line		
Storage tank & pump	No	
Sprinkler system		13,225.00
Any additional hard costs	Yearly water line cost	23.00
	Design	2,500.00
	As built	500.00
Total hard costs		17,998.00
Broker's commission	5% of sales price	946.69
Builder's O&P	20% of sales price	4,736.17
Cost to homeowner		**23,680.87**

Description of system

Hydrant flow test, PE stamped shop drawings, fire dept. permint, NFPA 13-D system, CPVC pipe used where within it's listing, white residential pendent sprinkler heads installed in areas with finished ceilings, brass pendents installed in basement area, no heads in attics, baths under 55 sf and all other areas not required by NFPA 13-D

APPENDIX F

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APPENDIX G

"13D Requirements" Table – 1 Page

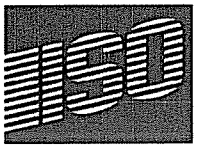
13D Requirements/Impediments

REQUIRED (R) or NOT REQUIRED (NR) or UNRESOLVED (UR) or ALLOWED (ALLOW) or UNKNOWN (UK) & PROBABLE COST	NFPA 13D BASELINE (1)	NFPA 13D BASELINE (2)	NFPA 13D BASELINE (3)	NFPA 13D BASELINE (4)	NFPA 13D BASELINE (5)	NFPA 13D BASELINE (6)
	Multi-Purpose Piping System (Plumbing and Sprinkler System)	Independent Potable and Sprinkler Systems w/ 1 Common Water Main	Independent Potable and Sprinkler Systems w/ both a Potable Water Mainand an Independent FireMain	Tank and Pump System (W/ or W/O an External Water Supply)	Pressurized Tank (W/ or W/O an External Water Supply)	Onsite Well and Pump
Designed by a Registered Design Professional	R/ALLOW	R/ALLOW	R/ALLOW	R/ALLOW	R/ALLOW	R/ALLOW
Designed by the Licensed Sprinkler Fitter	R/ALLOW	R/ALLOW	R/ALLOW	R/ALLOW	R/ALLOW	R/ALLOW
Designed by NICET –certified Individual	Believed currently not recognized	Believed currently not recognized	Believed currently not recognized	Believed currently not recognized	Believed currently not recognized	Believed currently not recognized
Installed by a Mass.-Licensed Plumber (MLP)	UR	Potable by MLP, Sprinkler by MLSF	Potable by MLP, Sprinkler by MLSF	Sprinkler by MLSF	Sprinkler by MLSF	Potable by MLP, Sprinkler by MLSF
Installed by a Mass.-Licensed Sprinkler Fitter (MLSF)	UR	Potable by MLP, Sprinkler by MLSF	Potable by MLP, Sprinkler by MLSF	Sprinkler by MLSF	Sprinkler by MLSF	Potable by MLP, Sprinkler by MLSF
Single Common Water Main from the Street	R	R	N/A	-	-	-
A Potable Main + a Fire Main	N/A	N/A	R/ALLOW	-	-	-
If a separate Fire Main, placed by a Licensed Sprinkler Fitter	-	NR	R	-	-	-
If a Common Water + Fire Main, placed by a city/town-approved Drain Layer	Yes	Yes	Licensed Sprinkler fitter for the independent fire sprinkler main	-	-	-
Water Flow Alarm	NR	NR	NR	NR	NR	NR
Sprinkler System Supervision	NR	NR	NR	NR	NR	NR
As only a life-safety System, can System be shut down if House is closed up?	ALLOW/ but possible conflict w/ MGL c. 148 § 27A	ALLOW/ but possible conflict w/ MGL c. 148 § 27A	ALLOW/ but possible conflict w/ MGL c. 148 § 27A	ALLOW/ but possible conflict w/ MGL c. 148 § 27A	ALLOW/ but possible conflict w/ MGL c. 148 § 27A	ALLOW/ but possible conflict w/ MGL c. 148 § 27A
Antifreeze Required?	NR for basic "13D"	NR for basic "13D"	NR for basic "13D"	NR for basic "13D"	NR for basic "13D"	NR for basic "13D"
System constructed w/PEX Tubing?	Allowed but Labor issues exist	-	-	-	-	-
System constructed w/CPVC Piping?	-	ALLOW/NR min.	ALLOW/NR min.	ALLOW/NR min.	ALLOW/NR min.	ALLOW/NR min.
System constructed w/Copper Piping?	-	ALLOW/R min.	ALLOW/R min.	ALLOW/R min.	ALLOW/R min.	ALLOW/R min.
System constructed w/Steel Piping?	-	ALLOW/NR min.	ALLOW/NR min.	ALLOW/NR min.	ALLOW/NR min.	ALLOW/NR min.
Fire Department Connection (Siamese) Required?	NR	NR	NR	NR	NR	NR
Water Purveyor Basic Charge?[1]	Varies	Varies	Varies	Varies	Varies	Varies
Water Purveyor Water Development Charge?[1]	Varies	Varies	Varies	Varies	Varies	Varies
Water Purveyor Cost/ft. of Fire Main?[1]	Varies	Varies	Varies	Varies	Varies	Varies
Water Purveyor Fire Protection Fee?[1]	Varies	Varies	Varies	Varies	Varies	Varies
Water Purveyor Backflow Preventer Test Fee?[2]	Varies	Varies	Varies	Varies	Varies	Varies
Water Purveyor Other Fees?[2]	Varies	Varies	Varies	Varies	Varies	Varies
Backflow Preventer Non-testable Device?[2]	R? / Varies	R? / Varies	R? / Varies	UK/No	UK/No	UK/No
Backflow Preventer Testable Device?[2]	R / NR? / Varies	R / NR? / Varies	R / NR? / Varies	UK/No	UK/No	UK/No

1. See Appendix D-4 for additional information
2. See Appendix D-3 for additional information

APPENDIX H

"RESIDENTIAL SPRINKLERS ISO FACT SHEET" – 1 Page



INSURANCE SERVICES OFFICE, INC.

www.isomitigation.com 800-444-4554

RESIDENTIAL SPRINKLERS ISO FACT SHEET

ISO is an independent statistical, rating, and advisory organization that serves the property/casualty insurance industry. ISO is the leading supplier of underwriting information, advisory loss costs, supplementary rating information and standardized policy language to insurers in all 50 states and the District of Columbia. ISO offers the following regarding how residential sprinklers are reflected in ISO's advisory residential property programs:

PREMIUM DISCOUNTS

The standard ISO Dwelling Fire and Homeowners Programs contain available premium Credits for installation of fire sprinkler protection up to a maximum of:

- 13% for full sprinkler protection that includes all areas of a home, including attics, bathrooms, closets, and attached structures;
- 8% for fire sprinkler protection of all areas of a home excluding the attic, bathrooms, closets, and attached structures as long as fire detection equipment is installed in those areas where sprinklers are omitted;

Individual insurer programs may provide different credits.

SPRINKLER "LEAKAGE" COVERAGE

The presence of a residential sprinkler system may raise concern about the risk of accidental water leakage from the system. ISO's standard Homeowners policy forms provide coverage for "...accidental discharge or overflow of water...from within a...fire protective sprinkler system...". This coverage is included in the basic policy. There is no extra charge for this coverage.

Also, coverage is provided for water damage related to the suppression or extinguishment of a covered fire.

Individual insurer programs may provide variations to this coverage.

BUILDING CODE EFFECTIVENESS GRADING SCHEDULE

The ISO Building Code Effectiveness Grading Schedule (BCEGS®) is used to review public building code enforcement agencies and to develop a classification that is provided as advisory information to insurers who may use it for insurance underwriting and rating. If the requirement of the International Residential Code (2009) for automatic fire sprinkler protection of residential dwellings was removed by legislation or local ordinance, BCEGS would not provide full recognition for adoption of code without amendments. A building code enforcement agency which adopted a code with amendments that weaken hazard mitigation issues as defined in the model codes and referenced standards would not receive maximum recognition for code adoption.