DHCD, DBFR 2009 Code Change Process

June 3, 2009 Workgroup 4 Sub-Workgroup on Residential Sprinklers Meeting Agenda Package

CODE ISSUES:

1. 2009 IRC provisions **(Page 4)**
2. ICC changes **(Page 17)**
3. Manufactured Homes **(Page 44)**

DISCUSSION:

1. Options **(Page 50)**
    - Mandatory with delayed implementation date
    - Delete
    - Incentives
    - Non-mandatory with or without incentives
    - Passive construction improvements
    - Townhomes only
2. Fire Data and Recent Fires in Prince William and Loudoun Counties **(Page 57)**
3. Other Factors **(Page 76)**
    - Water fees
    - Lightweight construction
    - Fire-safe cigarettes
    - Arc fault devices
    - Insurance
    - Cost data
    - Educational efforts and operational practices
4. Current USBC Group R-2 Exemption **(Page 84)**
5. New Business and Next Meeting Date (June 30, 2009)

Board of Housing and Community Development (BHCD), Fire Services Board (FSB) and BHCD's Codes and Standards Committee
2009 Regulatory Action and Meeting Dates

These dates are subject to change.

January 26, 2009: BHCD presented with 2009 regulatory schedule.

March 23, 2009: BHCD approves Notice of Intended Regulatory Action (NOIRA).

May 18, 2009: BHCD's Codes and Standards Committee will meet from approximately 11:00 a.m. to 4:00 p.m. at DHCD, 1st floor board room (right after the BHCD board meeting that will be from10:00 a.m. to 11:00p.m.). Four Work Groups, advisory committees, Fire Services Code Committee and associations should have identified their 2009 code changes and gained consensus where possible.

June 22, 2009: BHCD's Codes and Standards Committee will meet to review non-consensus items at DHCD, 1st floor board room from 9:30 a.m. to 4:00 p.m.

July 27, 2009: BHCD will meet at VDHA, 4224 Cox Road (Innsbrook), 1st floor. BHCD and FSB Public Hearing at 9:30 a.m., Codes and Standards Committee following the hearing from approximately 11:00 a.m. to 12:15 p.m. and BHCD Board meeting at 1:00 p.m. to approve the 2009 proposed regulations.

August, September, and October, 2009: No meetings during this time as regulations are approved for publication and 60 days comment period.

November 16th or December 21st, 2009: BHCD's Codes and Standards Committee will meet to review public comments on the proposed regulations, carry-over code changes and new code changes.

January 18th or 25th, 2010: BHCD and FSB will hold a public hearing on the proposed regulations.

March 1, 2010: Deadline for new code changes.

May 17, 2010: BHCD's Codes and Standards Committee will meet to consider all code changes not approved, public comments or any new code changes and a final review of the regulations and approval to submit for the BHCD to approve.

June 21, 2010: BHCD approve final regulations with input from the FSB on the SFPC. Codes and Standards Committee will have a short meeting prior to the BHCD meeting.

September 30, 2010: Effective date of final regulations if approved by the OAG and Governor's Office.

(Updated March 27, 2009)

2009 BHCD Regulatory Cycle Schedule and Meetings for the USBC, SFPC, VADR, VCS, MHSR and the IBSR

March 19, 2009: Work Group 2 - Administrative and Selected Technical Issues for the USBC, SFPC, MHSR, IBSR, VADR and VCS Regulations meets.

March 23, 2009: BHCD approves the publication of the NOIRA's for each regulation.

March 26, 2009: Work Group 1 - USBC Energy Code Requirements meets.

April 2, 2009: Work Group 3 - USBC/SFPC Technical Amendments meets.

April 9, 2009: Work Group 4 - International Residential Code meets.

April 23, 2009: Work Group 1 - USBC Energy Code Requirements meets.

April 30, 2009: Work Group 2 - Administrative and Selected Technical Issues for the USBC, SFPC, MHSR, IBSR, VADR and VCS Regulations meets.

May 6, 2009: Work Group 3 - USBC/SFPC Technical Amendments meets.

May 13, 2009: Work Group 4 - International Residential Code meets.

May 18, 2009: BHCD's Codes and Standards Committee meets - 1st floor board room at DHCD from approximately 11:00 to 4:00 (following the regular scheduled BHCD meeting).

June 22, 2009: BHCD's Codes and Standards Committee meets 1st floor board room at DHCD from 9:30 to 4:00.

July 27, 2009: BHCD and Fire Services Board will hold a public hearing at 9:30 a.m. The Codes and Standards Committee will meet from approximately 11:00 to 12:15. The BHCD will meet at 1:00 to approve the draft regulations. The meetings will be held at VDHA in Innsbrook at 4224 Cox Road, 1st floor.

August to October, 2009: 60 day public comment period for the proposed USBC, SFPC and related regulations.

November 16th or December 21st, 2009: BHCD's Codes and Standards Committee meets to consider public comments, carry-over code changes from the Work Groups 1-4 meetings and any new code changes.

January 18th or 25th, 2010: BHCD and Fire Service Board will hold a second public hearing.

March 1, 2010: Deadline for 2009 code changes.

May 17, 2010: BHCD's Codes and Standards Committee meets to consider all remaining code changes and approve the final regulations for submission to the full BHCD.

June 21, 2010: BHCD approve final regulations with input from the FSB.

Effective Date: September 30, 2010.

(Updated March 27, 2009)

SECTION R312
GUARDS

R312.1 Where required. *Guards* shall be located along open-sided walking surfaces, including stairs, ramps and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or *grade* below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a *guard*.

R312.2 Height. Required *guards* at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches (914 mm) high measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads.

Exceptions:

1. *Guards* on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the *guard* also serves as a handrail on the open sides of stairs, the top of the *guard* shall not be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

R312.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height which allow passage of a sphere 4 inches (102 mm) in diameter.

Exceptions:

1. The triangular openings at the open side of a stair, formed by the riser, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open sides of stairs shall not have openings which allow passage of a sphere $4^3/_8$ inches (111 mm) in diameter.

R312.4 Exterior woodplastic composite guards. Woodplastic composite *guards* shall comply with the provisions of Section R317.4.

SECTION R313
AUTOMATIC FIRE SPRINKLER SYSTEMS

R313.1 Townhouse automatic fire sprinkler systems. An automatic residential fire sprinkler system shall be installed in *townhouses*.

Exception: An automatic residential fire sprinkler system shall not be required when *additions* or *alterations* are made to existing *townhouses* that do not have an automatic residential fire sprinkler system installed.

R313.1.1 Design and installation. Automatic residential fire sprinkler systems for *townhouses* shall be designed and installed in accordance with Section P2904.

R313.2 One- and two-family dwellings automatic fire systems. Effective January 1, 2011, an automatic residential fire sprinkler system shall be installed in one- and two- family *dwellings*.

Exception: An automatic residential fire sprinkler system shall not be required for *additions* or *alterations* to existing buildings that are not already provided with an automatic residential sprinkler system.

R313.2.1 Design and installation. Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.

SECTION R314
SMOKE ALARMS

R314.1 Smoke detection and notification. All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning *equipment* provisions of NFPA 72.

R314.2 Smoke detection systems. Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination of smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and owned by the homeowner. The system shall be monitored by an *approved* supervising station and be maintained in accordance with NFPA 72.

Exception: Where smoke alarms are provided meeting the requirements of Section R314.4.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional *story* of the *dwelling*, including *basements* and habitable attics but not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

When more than one smoke alarm is required to be installed within an individual *dwelling* unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

R314.3.1 Alterations, repairs and additions. When *alterations*, repairs or *additions* requiring a *permit* occur, or when one or more sleeping rooms are added or created in existing *dwellings*, the individual *dwelling unit* shall be equipped with smoke alarms located as required for new *dwellings*.

Exceptions:

1. Work involving the exterior surfaces of *dwellings*, such as the replacement of roofing or siding, or the *addition* or replacement of windows or doors, or

P2903.10 Hose bibb. Hose bibbs subject to freezing, including the "frost-proof" type, shall be equipped with an accessible stop-and-waste-type valve inside the building so that they can be controlled and/or drained during cold periods.

Exception: Frostproof hose bibbs installed such that the stem extends through the building insulation into an open heated or semi*conditioned space* need not be separately valved (see Figure P2903.10).

SECTION P2904
DWELLING UNIT FIRE SPRINKLER SYSTEMS

P2904.1 General. Where installed, residential fire sprinkler systems, or portions thereof, shall be in accordance with NFPA 13D or Section P2904, which shall be considered equivalent to NFPA 13D. Section P2904 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose fire sprinkler system shall supply domestic water to both fire sprinklers and plumbing fixtures. A stand-alone sprinkler system shall be separate and independent from the water distribution system. A backflow flow preventer shall not be required to separate a stand-alone sprinkler system from the water distribution system.

P2904.1.1 Required sprinkler locations. Sprinklers shall be installed to protect all areas of a *dwelling unit*.

Exceptions:

1. Attics, crawl spaces and normally unoccupied concealed spaces that do not contain fuel-fired appliances do not require sprinklers. In *attics*, crawl spaces and normally unoccupied concealed spaces that contain fuel-fired equipment, a sprinkler shall be installed above the equipment; however, sprinklers shall not be required in the remainder of the space.
2. Clothes closets, linen closets and pantries not exceeding 24 square feet (2.2 m^2) in area, with the smallest dimension not greater than 3 feet (915 mm) and having wall and ceiling surfaces of gypsum board.
3. Bathrooms not more than 55 square feet (5.1 m^2) in area.
4. Garages; carports; exterior porches; unheated entry areas, such as mud rooms, that are adjacent to an exterior door; and similar areas.

P2904.2 Sprinklers. Sprinklers shall be new listed residential sprinklers and shall be installed in accordance with the sprinkler manufacturer's installation instructions.

P2904.2.1 Temperature rating and separation from heat sources. Except as provided for in Section P2904.2.2, sprinklers shall have a temperature rating of not less than 135°F (57°C) and not more than 170°F (77°C). Sprinklers shall be separated from heat sources as required by the sprinkler manufacturer's installation instructions.

P2904.2.2 Intermediate temperature sprinklers. Sprinklers shall have an intermediate temperature rating not less than 175°F (79°C) and not more than 225°F (107°C) where installed in the following locations:

1. Directly under skylights, where the sprinkler is exposed to direct sunlight.
2. In *attics*.
3. In concealed spaces located directly beneath a roof.
4. Within the distance to a heat source as specified in Table P2904.2.2

P2904.2.3 Freezing areas. Piping shall be protected from freezing as required by Section P2603.6. Where sprinklers are required in areas that are subject to freezing, dry-sidewall or dry-pendent sprinklers extending from a nonfreezing area into a freezing area shall be installed.

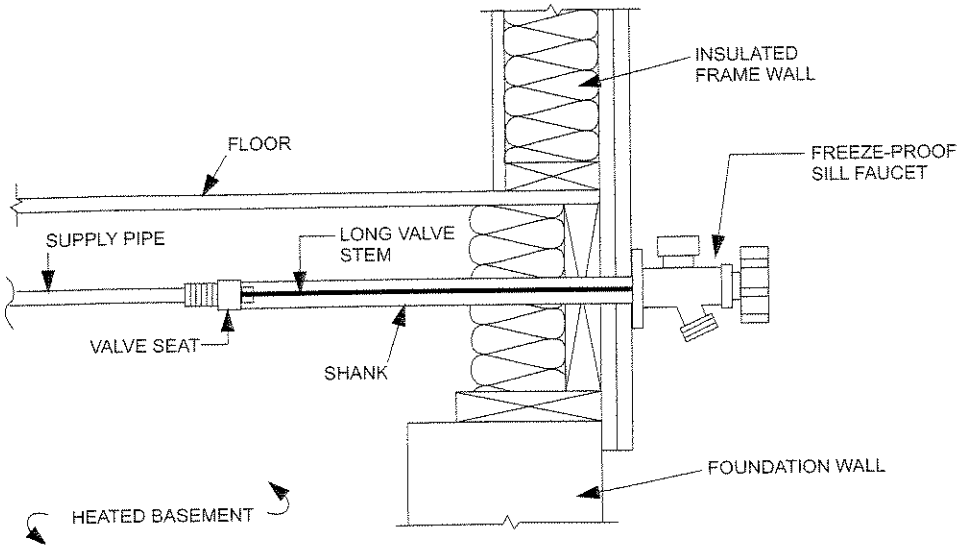

FIGURE P2903.10
TYPICAL FROSTPROOF HOSE BIBB INSTALLATION NOT REQUIRING SEPARATE VALUE

TABLE P2904.2.2
LOCATIONS WHERE INTERMEDIATE TEMPERATURE SPRINKLERS ARE REQUIRED

HEAT SOURCE	RANGE OF DISTANCE FROM HEAT SOURCE WITHIN WHICH INTERMEDIATE TEMPERATURE SPRINKLERS ARE REQUIRED[a,b] (inches)
Fireplace, side of open or recessed fireplace	12 to 36
Fireplace, front of recessed fireplace	36 to 60
Coal and wood burning stove	12 to 42
Kitchen range top	9 to 18
Oven	9 to 18
Vent connector or chimney connector	9 to 18
Heating duct, not insulated	9 to 18
Hot water pipe, not insulated	6 to 12
Side of ceiling or wall warm air register	12 to 24
Front of wall mounted warm air register	18 to 36
Water heater, furnace or boiler	3 to 6
Luminaire up to 250 watts	3 to 6
Luminaire 250 watts up to 499 watts	6 to 12

For SI: 1 inch = 25.4 mm.
a. Sprinklers shall not be located at distances less than the minimum table distance unless the sprinkler listing allows a lesser distance.
b. Distances shall be measured in a straight line from the nearest edge of the heat source to the nearest edge of the sprinkler

P2904.2.4 Sprinkler coverage. Sprinkler coverage requirements and sprinkler obstruction requirements shall be in accordance with Sections P2904.2.4.1 and P2904.2.4.2.

P2904.2.4.1 Coverage area limit. The area of coverage of a single sprinkler shall not exceed 400 square feet (37 m^2) and shall be based on the sprinkler listing and the sprinkler manufacturer's installation instructions.

P2904.2.4.2 Obstructions to coverage. Sprinkler discharge shall not be blocked by obstructions unless additional sprinklers are installed to protect the obstructed area. Sprinkler separation from obstructions shall comply with the minimum distances specified in the sprinkler manufacturer's instructions.

P2904.2.4.2.1 Additional requirements for pendent sprinklers. Pendent sprinklers within 3 feet (915 mm) of the center of a ceiling fan, surface-mounted ceiling luminaire or similar object shall be considered to be obstructed, and additional sprinklers shall be installed.

P2904.2.4.2.2 Additional requirements for sidewall sprinklers. Sidewall sprinklers within 5 feet (1524 mm) of the center of a ceiling fan, surface-mounted ceiling luminaire or similar object shall be considered to be obstructed, and additional sprinklers shall be installed.

P2904.2.5 Sprinkler installation on systems assembled with solvent cement. The solvent cementing of threaded adapter fittings shall be completed and threaded adapters for sprinklers shall be verified as being clear of excess cement prior to the installation of sprinklers on systems assembled with solvent cement.

P2904.2.6 Sprinkler modifications prohibited. Painting, caulking or modifying of sprinklers shall be prohibited. Sprinklers that have been painted, caulked, modified or damaged shall be replaced with new sprinklers.

P2904.3 Sprinkler piping system. Sprinkler piping shall be supported in accordance with the requirements for cold water distribution piping. Sprinkler piping shall comply with all requirements for cold water distribution piping. For multipurpose piping systems, the sprinkler piping shall connect to and be a part of the cold water distribution piping system.

P2904.3.1 Nonmetallic pipe and tubing. Nonmetallic pipe and tubing, such as CPVC and PEX, shall be listed for use in residential fire sprinkler systems.

P2904.3.1.1 Nonmetallic pipe protection. Nonmetallic pipe and tubing systems shall be protected from exposure to the living space by a layer of not less than $^3/_8$ inch (9.5 mm) thick gypsum wallboard, $^1/_2$ inch thick plywood (13 mm), or other material having a 15 minute fire rating.

Exceptions:

1. Pipe protection shall not be required in areas that do not require protection with sprinklers as specified in Section P2904.1.1.
2. Pipe protection shall not be required where exposed piping is permitted by the pipe listing.

P2904.3.2 Shutoff valves prohibited. With the exception of shutoff valves for the entire water distribution system, valves shall not be installed in any location where the valve would isolate piping serving one or more sprinklers.

P2904.3.3 Single dwelling limit. Piping beyond the service valve located at the beginning of the water distribution system shall not serve more than one *dwelling*.

P2904.3.4 Drain. A means to drain the sprinkler system shall be provided on the system side of the water distribution shutoff valve.

P2904.4 Determining system design flow. The flow for sizing the sprinkler piping system shall be based on the flow rating of each sprinkler in accordance with Section P2904.4.1 and the calculation in accordance with Section P2904.4.2.

P2904.4.1 Determining required flow rate for each sprinkler. The minimum required flow for each sprinkler shall be determined using the sprinkler manufacturer's published data for the specific sprinkler model based on all of the following:

1. The area of coverage.
2. The ceiling configuration.
3. The temperature rating.
4. Any additional conditions specified by the sprinkler manufacturer.

P2904.4.2 System design flow rate. The design flow rate for the system shall be based on the following:

1. The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section P2904.4.1.
2. The design flow rate for a room having two or more sprinklers a shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section P2904.4.1, and multiplying that flow rate by 2.
3. Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required flow rate for that room shall comply with the sprinkler manufacturer's instructions.
4. The design flow rate for the sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1, 2 and 3.
5. For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches (203 mm) in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

P2904.5 Water supply. The water supply shall provide not less than the required design flow rate for sprinklers in accordance with Section P2904.4.2 at a pressure not less than that used to comply with Section P2904.6.

P2904.5.1 Water supply from individual sources. Where a *dwelling unit* water supply is from a tank system, a private well system or a combination of these, the available water supply shall be based on the minimum pressure control setting for the pump.

P2904.5.2 Required capacity. The water supply shall have the capacity to provide the required design flow rate for sprinklers for a period of time as follows:

1. 7 minutes for *dwelling units* one *story* in height and less than 2,000 square feet (186 m^2) in area.
2. 10 minutes for *dwelling units* two or more stories in height or equal to or greater than 2,000 square feet (186 m^2) in area.

Where a well system, a water supply tank system or a combination thereof is used, any combination of well capacity and tank storage shall be permitted to meet the capacity requirement.

P2904.6 Pipe sizing. The piping to sprinklers shall be sized for the flow required by Section P2904.4.2. The flow required to supply the plumbing fixtures shall not be required to be added to the sprinkler design flow.

P2904.6.1 Method of sizing pipe. Piping supplying sprinklers shall be sized using the prescriptive method in Section P2904.6.2 or by hydraulic calculation in accordance with NFPA 13D. The minimum pipe size from the water supply source to any sprinkler shall be $^3/_4$ inch (19 mm) nominal. Threaded adapter fittings at the point where sprinklers are attached to the piping shall be a minimum of $^1/_2$ inch (13 mm) nominal.

P2904.6.2 Prescriptive pipe sizing method. Pipe shall be sized by determining the available pressure to offset friction loss in piping and identifying a piping material, diameter and length using the equation in Section P2904.6.2.1 and the procedure in Section P2904.6.2.2.

P2904.6.2.1 Available pressure equation. The pressure available to offset friction loss in the interior piping system (P_t) shall be determined in accordance with the Equation 29-1.

$$P_t = P_{sup} - PL_{svc} - PL_m - PL_d - PL_e - P_{sp} \quad \textbf{(Equation 29-1)}$$

where:

P_t = Pressure used in applying Tables P2904.6.2(4) through P2904.6.2(9).

P_{sup} = Pressure available from the water supply source.

PL_{svc} = Pressure loss in the water-service pipe.

PL_m = Pressure loss in the water meter.

PL_d = Pressure loss from devices other than the water meter.

PL_e = Pressure loss associated with changes in elevation.

P_{sp} = Maximum pressure required by a sprinkler.

2904.6.2.2 Calculation procedure. Determination of the required size for water distribution piping shall be in accordance with the following procedure:

Step 1–Determine P_{sup}

Obtain the static supply pressure that will be available from the water main from the water purveyor, or for an

individual source, the available supply pressure shall be in accordance with Section P2904.5.1.

Step 2–Determine PL_{svc}

Use Table P2904.6.2(1) to determine the pressure loss in the water service pipe based on the selected size of the water service.

Step 3–Determine PL_m

Use Table P2904.6.2(2) to determine the pressure loss from the water meter, based on the selected water meter size.

Step 4–Determine PL_d

Determine the pressure loss from devices other than the water meter installed in the piping system supplying sprinklers, such as pressure-reducing valves, backflow preventers, water softeners or water filters. Device pressure losses shall be based on the device manufacturer's specifications. The flow rate used to determine pressure loss shall be the rate from Section P2904.4.2, except that 5 gpm (0.3 L/S) shall be added where the device is installed in a water-service pipe that supplies more than one *dwelling*. As alternative to deducting pressure loss for a device, an automatic bypass valve shall be installed to divert flow around the device when a sprinkler activates.

Step 5–Determine PL_e

Use Table P2904.6.2(3) to determine the pressure loss associated with changes in elevation. The elevation used in applying the table shall be the difference between the elevation where the water source pressure was measured and the elevation of the highest sprinkler.

Step 6–Determine P_{sp}

Determine the maximum pressure required by any individual sprinkler based on the flow rate from Section P2904.4.1. The required pressure is provided in the sprinkler manufacturer's published data for the specific sprinkler model based on the selected flow rate.

Step 7–Calculate P_t

Using Equation 29-1, calculate the pressure available to offset friction loss in water-distribution piping between the service valve and the sprinklers.

Step 8–Determine the maximum allowable pipe length

Use Tables P2904.6.2(4) through P2904.6.2(9) to select a material and size for water distribution piping. The piping material and size shall be acceptable if the *developed length* of pipe between the service valve and the most remote sprinkler does not exceed the maximum allowable length specified by the applicable table. Interpolation of P_t between the tabular values shall be permitted.

The maximum allowable length of piping in Tables P2904.6.2(4) through P2904.6.2(9) incorporates an adjustment for pipe fittings, and no additional consideration of friction losses associated with pipe fittings shall be required.

P2904.7 Instructions and signs. An owner's manual for the fire sprinkler system shall be provided to the owner. A sign or valve tag shall be installed at the main shutoff valve to the water distribution system stating the following: "Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign."

P2904.8 Inspections. The water distribution system shall be inspected in accordance with Sections P2904.8.1 and P2904.8.2.

P2904.8.1 Preconcealment inspection. The following items shall be verified prior to the concealment of any sprinkler system piping:

1. Sprinklers are installed in all areas as required by Section P2904.1.1.
2. Where sprinkler water spray patterns are obstructed by construction features, luminaires or ceiling fans, additional sprinklers are installed as required by Section P2904.2.4.2.
3. Sprinklers are the correct temperature rating and are installed at or beyond the required separation distances from heat sources as required by Sections P2904.2.1 and P2904.2.2.
4. The pipe size equals or exceeds the size used in applying Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, the size used in the hydraulic calculation.
5. The pipe length does not exceed the length permitted by Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, pipe lengths and fittings do not exceed those used in the hydraulic calculation.
6. Nonmetallic piping that conveys water to sprinklers is listed for use with fire sprinklers.
7. Piping is supported in accordance with the pipe manufacturer's and sprinkler manufacturer's installation instructions.
8. The piping system is tested in accordance with Section P2503.7.

P2904.8.2 Final inspection. The following items shall be verified upon completion of the system:

1. Sprinkler are not painted, damaged or otherwise hindered from operation.
2. Where a pump is required to provide water to the system, the pump starts automatically upon system water demand.
3. Pressure-reducing valves, water softeners, water filters or other impairments to water flow that were not part of the original design have not been installed.
4. The sign or valve tag required by Section P2904.7 is installed and the owner's manual for the system is present.

TABLE P2904.6.2(1)
WATER SERVICE PRESSURE LOSS (PL_{svc})[a,b]

FLOW RATE[c] (gpm)	$^3/_4$ INCH WATER SERVICE PRESSURE LOSS (psi)				1 INCH WATER SERVICE PRESSURE LOSS (psi)				$1^1/_4$ INCH WATER SERVICE PRESSURE LOSS (psi)			
	Length of water service pipe (feet)				Length of water service pipe (feet)				Length of water service pipe (feet)			
	40 or less	41 to 75	76 to 100	101 to 150	40 or less	41 to 75	76 to 100	101 to 150	40 or less	41 to 75	76 to 100	101 to 150
8	5.1	8.7	11.8	17.4	1.5	2.5	3.4	5.1	0.6	1.0	1.3	1.9
10	7.7	13.1	17.8	26.3	2.3	3.8	5.2	7.7	0.8	1.4	2.0	2.9
12	10.8	18.4	24.9	NP	3.2	5.4	7.3	10.7	1.2	2.0	2.7	4.0
14	14.4	24.5	NP	NP	4.2	7.1	9.6	14.3	1.6	2.7	3.6	5.4
16	18.4	NP	NP	NP	5.4	9.1	12.4	18.3	2.0	3.4	4.7	6.9
18	22.9	NP	NP	NP	6.7	11.4	15.4	22.7	2.5	4.3	5.8	8.6
20	27.8	NP	NP	NP	8.1	13.8	18.7	27.6	3.1	5.2	7.0	10.4
22	NP	NP	NP	NP	9.7	16.5	22.3	NP	3.7	6.2	8.4	12.4
24	NP	NP	NP	NP	11.4	19.3	26.2	NP	4.3	7.3	9.9	14.6
26	NP	NP	NP	NP	13.2	22.4	NP	NP	5.0	8.5	11.4	16.9
28	NP	NP	NP	NP	15.1	25.7	NP	NP	5.7	9.7	13.1	19.4
30	NP	NP	NP	NP	17.2	NP	NP	NP	6.5	11.0	14.9	22.0
32	NP	NP	NP	NP	19.4	NP	NP	NP	7.3	12.4	16.8	24.8
34	NP	NP	NP	NP	21.7	NP	NP	NP	8.2	13.9	18.8	NP
36	NP	NP	NP	NP	24.1	NP	NP	NP	9.1	15.4	20.9	NP

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 0.063 L/s, 1 pound per square inch = 6.895 kPa.

NP - Not permitted. Pressure loss exceeds reasonable limits.

a. Values are applicable for underground piping materials listed in Table P2905.4 and are based on an SDR of 11 and a Hazen Williams C Factor of 150.

b. Values include the following length allowances for fittings: 25% length increase for actual lengths up to 100 feet and 15% length increase for actual lengths over 100 feet.

c. Flow rate from Section P2904.4.2. Add 5 gpm to the flow rate required by Section P2904.4.2 where the water-service pipe supplies more than one dwelling.

TABLE P2904.6.2(2)
MINIMUM WATER METER PRESSURE LOSS (PL_m)[a]

FLOW RATE (gallons per minute, gpm)[b]	$^5/_8$-INCH METER PRESSURE LOSS (pounds per square inch, psi)	$^3/_4$-INCH METER PRESSURE LESS (pounds per square inch, psi)	1-INCH METER PRESSURE LOSS (pounds per square inch, psi)
8	2	1	1
10	3	1	1
12	4	1	1
14	5	2	1
16	7	3	1
18	9	4	1
20	11	4	2
22	NP	5	2
24	NP	5	2
26	NP	6	2
28	NP	6	2
30	NP	7	2
32	NP	7	3
34	NP	8	3
36	NP	8	3

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.063 L/s.

NP - Not permitted unless the actual water meter pressure loss is known.

a. Table 2904.6.2(2) establishes conservative values for water meter pressure loss or installations where the water meter loss is unknown. Where the actual water meter pressure loss is known, P_m shall be the actual loss.

b. Flow rate from Section P2904.4.2. Add 5 gpm to the flow rate required by Section P2904.4.2 where the water-service pipe supplies more than one dwelling.

TABLE P2904.6.2(3)
ELEVATION LOSS (PL_e)

ELEVATION (feet)	PRESSURE LOSS (psi)
5	2.2
10	4.4
15	6.5
20	8.7
25	10.9
30	13
35	15.2
40	17.4

For SI: 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa.

TABLE P2904.6.2(4)
ALLOWABLE PIPE LENGTH FOR $^3/_4$-INCH TYPE M COPPER WATER TUBING

SPRINKLER FLOW RATE[a] (gpm)	WATER DISTRIBUTION SIZE (inch)	AVAILABLE PRESSURE - P_f (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable length of pipe from service valve to farthest sprinkler (feet)									
8	$^3/_4$	217	289	361	434	506	578	650	723	795	867
9	$^3/_4$	174	232	291	349	407	465	523	581	639	697
10	$^3/_4$	143	191	239	287	335	383	430	478	526	574
11	$^3/_4$	120	160	200	241	281	321	361	401	441	481
12	$^3/_4$	102	137	171	205	239	273	307	341	375	410
13	$^3/_4$	88	118	147	177	206	235	265	294	324	353
14	$^3/_4$	77	103	128	154	180	205	231	257	282	308
15	$^3/_4$	68	90	113	136	158	181	203	226	248	271
16	$^3/_4$	60	80	100	120	140	160	180	200	220	241
17	$^3/_4$	54	72	90	108	125	143	161	179	197	215
18	$^3/_4$	48	64	81	97	113	129	145	161	177	193
19	$^3/_4$	44	58	73	88	102	117	131	146	160	175
20	$^3/_4$	40	53	66	80	93	106	119	133	146	159
21	$^3/_4$	36	48	61	73	85	97	109	121	133	145
22	$^3/_4$	33	44	56	67	78	89	100	111	122	133
23	$^3/_4$	31	41	51	61	72	82	92	102	113	123
24	$^3/_4$	28	38	47	57	66	76	85	95	104	114
25	$^3/_4$	26	35	44	53	61	70	79	88	97	105
26	$^3/_4$	24	33	41	49	57	65	73	82	90	98
27	$^3/_4$	23	30	38	46	53	61	69	76	84	91
28	$^3/_4$	21	28	36	43	50	57	64	71	78	85
29	$^3/_4$	20	27	33	40	47	53	60	67	73	80
30	$^3/_4$	19	25	31	38	44	50	56	63	69	75
31	$^3/_4$	18	24	29	35	41	47	53	59	65	71
32	$^3/_4$	17	22	28	33	39	44	50	56	61	67
33	$^3/_4$	16	21	26	32	37	42	47	53	58	63
34	$^3/_4$	NP	20	25	30	35	40	45	50	55	60
35	$^3/_4$	NP	19	24	28	33	38	42	47	52	57
36	$^3/_4$	NP	18	22	27	31	36	40	45	49	54
37	$^3/_4$	NP	17	21	26	30	34	38	43	47	51
38	$^3/_4$	NP	16	20	24	28	32	36	40	45	49
39	$^3/_4$	NP	15	19	23	27	31	35	39	42	46
40	$^3/_4$	NP	NP	18	22	26	29	33	37	40	44

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.963 L/s.
NP - Not permitted
a. Flow rate from Section P2904.4.2.

TABLE P2904.6.2(5)
ALLOWABLE PIPE LENGTH FOR 1-INCH TYPE M COPPER WATER TUBING

SPRINKLER FLOW RATE[a] (gpm)	WATER DISTRIBUTION SIZE (inch)	AVAILABLE PRESSURE - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable length of pipe from service valve to farthest sprinkler (feet)									
8	1	806	1075	1343	1612	1881	2149	2418	2687	2955	3224
9	1	648	864	1080	1296	1512	1728	1945	2161	2377	2593
10	1	533	711	889	1067	1245	1422	1600	1778	1956	2134
11	1	447	586	745	894	1043	1192	1341	1491	1640	1789
12	1	381	508	634	761	888	1015	1142	1269	1396	1523
13	1	328	438	547	657	766	875	985	1094	1204	1313
14	1	286	382	477	572	668	763	859	954	1049	1145
15	1	252	336	420	504	588	672	756	840	924	1008
16	1	224	298	373	447	522	596	671	745	820	894
17	1	200	266	333	400	466	533	600	666	733	799
18	1	180	240	300	360	420	479	539	599	659	719
19	1	163	217	271	325	380	434	488	542	597	651
20	1	148	197	247	296	345	395	444	493	543	592
21	1	135	180	225	270	315	360	406	451	496	541
22	1	124	165	207	248	289	331	372	413	455	496
23	1	114	152	190	228	267	305	343	381	419	457
24	1	106	141	176	211	246	282	317	352	387	422
25	1	98	131	163	196	228	261	294	326	359	392
26	1	91	121	152	182	212	243	273	304	334	364
27	1	85	113	142	170	198	226	255	283	311	340
28	1	79	106	132	159	185	212	238	265	291	318
29	1	74	99	124	149	174	198	223	248	273	298
30	1	70	93	116	140	163	186	210	233	256	280
31	1	66	88	110	132	153	175	197	219	241	263
32	1	62	83	103	124	145	165	186	207	227	248
33	1	59	78	98	117	137	156	176	195	215	234
34	1	55	74	92	111	129	148	166	185	203	222
35	1	53	70	88	105	123	140	158	175	193	210
36	1	50	66	83	100	116	133	150	166	183	199
37	1	47	63	79	95	111	126	142	158	174	190
38	1	45	60	75	90	105	120	135	150	165	181
39	1	43	57	72	86	100	115	129	143	158	172
40	1	41	55	68	82	96	109	123	137	150	164

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.963 L/s.
a. Flow rate from Section P2904.4.2.

TABLE P2904.6.2(6)
ALLOWABLE PIPE LENGTH FOR $^3/_4$-INCH CPVC PIPE

SPRINKLER FLOW RATE[a] (gpm)	WATER DISTRIBUTION SIZE (inch)	AVAILABLE PRESSURE - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable length of pipe from service valve to farthest sprinkler (feet)									
8	$^3/_4$	348	465	581	697	813	929	1045	1161	1278	1394
9	$^3/_4$	280	374	467	560	654	747	841	934	1027	1121
10	$^3/_4$	231	307	384	461	538	615	692	769	845	922
11	$^3/_4$	193	258	322	387	451	515	580	644	709	773
12	$^3/_4$	165	219	274	329	384	439	494	549	603	658
13	$^3/_4$	142	189	237	284	331	378	426	473	520	568
14	$^3/_4$	124	165	206	247	289	330	371	412	454	495
15	$^3/_4$	109	145	182	218	254	290	327	363	399	436
16	$^3/_4$	97	129	161	193	226	258	290	322	354	387
17	$^3/_4$	86	115	144	173	202	230	259	288	317	346
18	$^3/_4$	78	104	130	155	181	207	233	259	285	311
19	$^3/_4$	70	94	117	141	164	188	211	234	258	281
20	$^3/_4$	64	85	107	128	149	171	192	213	235	256
21	$^3/_4$	58	78	97	117	136	156	175	195	214	234
22	$^3/_4$	54	71	89	107	125	143	161	179	197	214
23	$^3/_4$	49	66	82	99	115	132	148	165	181	198
24	$^3/_4$	46	61	76	91	107	122	137	152	167	183
25	$^3/_4$	42	56	71	85	99	113	127	141	155	169
26	$^3/_4$	39	52	66	79	92	105	118	131	144	157
27	$^3/_4$	37	49	61	73	86	98	110	122	135	147
28	$^3/_4$	34	46	57	69	80	92	103	114	126	137
29	$^3/_4$	32	43	54	64	75	86	96	107	118	129
30	$^3/_4$	30	40	50	60	70	81	91	101	111	121
31	$^3/_4$	28	38	47	57	66	76	85	95	104	114
32	$^3/_4$	27	36	45	54	63	71	80	89	98	107
33	$^3/_4$	25	34	42	51	59	68	76	84	93	101
34	$^3/_4$	24	32	40	48	56	64	72	80	88	96
35	$^3/_4$	23	30	38	45	53	61	68	76	83	91
36	$^3/_4$	22	29	36	43	50	57	65	72	79	86
37	$^3/_4$	20	27	34	41	48	55	61	68	75	82
38	$^3/_4$	20	26	33	39	46	52	59	65	72	78
39	$^3/_4$	19	25	31	37	43	50	56	62	68	74
40	$^3/_4$	18	24	30	35	41	47	53	59	65	71

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.963 L/s.

a. Flow rate from Section P2904.4.2.

TABLE P2904.6.2(7)
ALLOWABLE PIPE LENGTH FOR 1-INCH CPVC PIPE

SPRINKLER FLOW RATE[a] (gpm)	WATER DISTRIBUTION SIZE (inch)	AVAILABLE PRESSURE - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable length of pipe from service valve to farthest sprinkler (feet)									
8	1	1049	1398	1748	2098	2447	2797	3146	3496	3845	4195
9	1	843	1125	1406	1687	1968	2249	2530	2811	3093	3374
10	1	694	925	1157	1388	1619	1851	2082	2314	2545	2776
11	1	582	776	970	1164	1358	1552	1746	1940	2133	2327
12	1	495	660	826	991	1156	1321	1486	1651	1816	1981
13	1	427	570	712	854	997	1139	1281	1424	1566	1709
14	1	372	497	621	745	869	993	1117	1241	1366	1490
15	1	328	437	546	656	765	874	983	1093	1202	1311
16	1	291	388	485	582	679	776	873	970	1067	1164
17	1	260	347	433	520	607	693	780	867	954	1040
18	1	234	312	390	468	546	624	702	780	858	936
19	1	212	282	353	423	494	565	635	706	776	847
20	1	193	257	321	385	449	513	578	642	706	770
21	1	176	235	293	352	410	469	528	586	645	704
22	1	161	215	269	323	377	430	484	538	592	646
23	1	149	198	248	297	347	396	446	496	545	595
24	1	137	183	229	275	321	366	412	458	504	550
25	1	127	170	212	255	297	340	382	425	467	510
26	1	118	158	197	237	276	316	355	395	434	474
27	1	111	147	184	221	258	295	332	368	405	442
28	1	103	138	172	207	241	275	310	344	379	413
29	1	97	129	161	194	226	258	290	323	355	387
30	1	91	121	152	182	212	242	273	303	333	364
31	1	86	114	143	171	200	228	257	285	314	342
32	1	81	108	134	161	188	215	242	269	296	323
33	1	76	102	127	152	178	203	229	254	280	305
34	1	72	96	120	144	168	192	216	240	265	289
35	1	68	91	114	137	160	182	205	228	251	273
36	1	65	87	108	130	151	173	195	216	238	260
37	1	62	82	103	123	144	165	185	206	226	247
38	1	59	78	98	117	137	157	176	196	215	235
39	1	56	75	93	112	131	149	168	187	205	224
40	1	53	71	89	107	125	142	160	178	196	214

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.963 L/s.

a. Flow rate from Section P2904.4.2.

TABLE P2904.6.2(8)
ALLOWABLE PIPE LENGTH FOR $^3/_4$-INCH PEX TUBING

SPRINKLER FLOW RATE[a] (gpm)	WATER DISTRIBUTION SIZE (inch)	AVAILABLE PRESSURE - P_t (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable length of pipe from service valve to farthest sprinkler (feet)									
8	$^3/_4$	93	123	154	185	216	247	278	309	339	370
9	$^3/_4$	74	99	124	149	174	199	223	248	273	298
10	$^3/_4$	61	82	102	123	143	163	184	204	225	245
11	$^3/_4$	51	68	86	103	120	137	154	171	188	205
12	$^3/_4$	44	58	73	87	102	117	131	146	160	175
13	$^3/_4$	38	50	63	75	88	101	113	126	138	151
14	$^3/_4$	33	44	55	66	77	88	99	110	121	132
15	$^3/_4$	29	39	48	58	68	77	87	96	106	116
16	$^3/_4$	26	34	43	51	60	68	77	86	94	103
17	$^3/_4$	23	31	38	46	54	61	69	77	84	92
18	$^3/_4$	21	28	34	41	48	55	62	69	76	83
19	$^3/_4$	19	25	31	37	44	50	56	62	69	75
20	$^3/_4$	17	23	28	34	40	45	51	57	62	68
21	$^3/_4$	16	21	26	31	36	41	47	52	57	62
22	$^3/_4$	NP	19	24	28	33	38	43	47	52	57
23	$^3/_4$	NP	17	22	26	31	35	39	44	48	52
24	$^3/_4$	NP	16	20	24	28	32	36	40	44	49
25	$^3/_4$	NP	NP	19	22	26	30	34	37	41	45
26	$^3/_4$	NP	NP	17	21	24	28	31	35	38	42
27	$^3/_4$	NP	NP	16	20	23	26	29	33	36	39
28	$^3/_4$	NP	NP	15	18	21	24	27	30	33	36
29	$^3/_4$	NP	NP	NP	17	20	23	26	28	31	34
30	$^3/_4$	NP	NP	NP	16	19	21	24	27	29	32
31	$^3/_4$	NP	NP	NP	15	18	20	23	25	28	30
32	$^3/_4$	NP	NP	NP	NP	17	19	21	24	26	28
33	$^3/_4$	NP	NP	NP	NP	16	18	20	22	25	27
34	$^3/_4$	NP	NP	NP	NP	NP	17	19	21	23	25
35	$^3/_4$	NP	NP	NP	NP	NP	16	18	20	22	24
36	$^3/_4$	NP	NP	NP	NP	NP	15	17	19	21	23
37	$^3/_4$	NP	NP	NP	NP	NP	NP	16	18	20	22
38	$^3/_4$	NP	NP	NP	NP	NP	NP	16	17	19	21
39	$^3/_4$	NP	NP	NP	NP	NP	NP	NP	16	18	20
40	$^3/_4$	NP	NP	NP	NP	NP	NP	NP	16	17	19

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.963 L/s.
NP - Not permitted.
a. Flow rate from Section P2904.4.2.

TABLE P2904.6.2(9)
ALLOWABLE PIPE LENGTH FOR 1-INCH PEX TUBING

SPRINKLER FLOW RATE[a] (gpm)	WATER DISTRIBUTION SIZE (inch)	AVAILABLE PRESSURE - P_i (psi)									
		15	20	25	30	35	40	45	50	55	60
		Allowable length of pipe from service valve to farthest sprinkler (feet)									
8	1	314	418	523	628	732	837	941	1046	1151	1255
9	1	252	336	421	505	589	673	757	841	925	1009
10	1	208	277	346	415	485	554	623	692	761	831
11	1	174	232	290	348	406	464	522	580	638	696
12	1	148	198	247	296	346	395	445	494	543	593
13	1	128	170	213	256	298	341	383	426	469	511
14	1	111	149	186	223	260	297	334	371	409	446
15	1	98	131	163	196	229	262	294	327	360	392
16	1	87	116	145	174	203	232	261	290	319	348
17	1	78	104	130	156	182	208	233	259	285	311
18	1	70	93	117	140	163	187	210	233	257	280
19	1	63	84	106	127	148	169	190	211	232	253
20	1	58	77	96	115	134	154	173	192	211	230
21	1	53	70	88	105	123	140	158	175	193	211
22	1	48	64	80	97	113	129	145	161	177	193
23	1	44	59	74	89	104	119	133	148	163	178
24	1	41	55	69	82	96	110	123	137	151	164
25	1	38	51	64	76	89	102	114	127	140	152
26	1	35	47	59	71	83	95	106	118	130	142
27	1	33	44	55	66	77	88	99	110	121	132
28	1	31	41	52	62	72	82	93	103	113	124
29	1	29	39	48	58	68	77	87	97	106	116
30	1	27	36	45	54	63	73	82	91	100	109
31	1	26	34	43	51	60	68	77	85	94	102
32	1	24	32	40	48	56	64	72	80	89	97
33	1	23	30	38	46	53	61	68	76	84	91
34	1	22	29	36	43	50	58	65	72	79	86
35	1	20	27	34	41	48	55	61	68	75	82
36	1	19	26	32	39	45	52	58	65	71	78
37	1	18	25	31	37	43	49	55	62	68	74
38	1	18	23	29	35	41	47	53	59	64	70
39	1	17	22	28	33	39	45	50	56	61	67
40	1	16	21	27	32	37	43	48	53	59	64

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.963 L/s.

a. Flow rate from Section P2904.4.2.

3. IRC 2006, Preface, Development, Page iii, 3rd paragraph "This code is founded on principles intended to establish provisions consistent with the scope of a residential code that adequately protects public health, safety and welfare; *provisions that do not unnecessarily increase construction costs*; provisions that do not restrict the use of new materials, products or methods of construction; and *provisions that do not give preferential treatment to particular types or classes of materials, products or methods of construction." [Emphasis added]*
4. IRC 2006, R101.3 Purpose. "The purpose of this code is *to provide minimum requirements* to safeguard the public safety, health and general welfare through affordability, structural strength, means of egress facilities, stability, sanitation, light and ventilation, energy conservation and safety to life and property from fire and other hazards attributed to the built environment. *[Emphasis added]*

Final Action: AS AM AMPC____ D

RB62-07/08
R313.1 (New), Appendix P, Chapter 43

Proposed Change as Submitted:

Proponent: Sandra Stanek, Fire Code Consultants LLC, representing herself; John C. Dean, National Association of State Fire Marshals (NASFM)

1. Add new text as follows:

SECTION R313
~~SMOKE ALARMS~~ FIRE SPRINKLER SYSTEMS

R313.1 General. An approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with NFPA 13D.

(Renumber subsequent sections)

2. Delete appendix without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA
13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason (Stanek): All new houses should have fire sprinklers. The majority of the members attending the Rochester ROC meeting in May 07 were in favor of residential sprinklers in all new one & two family dwellings. I believe the will of the majority of ICC members as shown in Rochester should be upheld.

There are many reasons why NOW is the time to change the IRC and establish residential sprinklers as part of the minimum safety package set forth in the national model code for residential construction. Substantial justification was offered last cycle, and additional substantiation is offered in this proposal, primarily focusing on the issues raised in opposition.

1. System freeze-ups in cold climates: Opponents of residential sprinklers assert that system freeze-ups will cause problems in cold climates. However, a sprinkler system poses no greater risk of freezing than domestic plumbing if the system is properly designed and installed. Freeze-ups result from design or installation errors that can occur with any plumbing system, and it is incorrect to suggest that sprinkler systems in cold climates are predisposed to freezing. In fact, on the contrary, there are many jurisdictions with severely freezing climates that have adopted residential sprinkler ordinances, which would surely have been repealed if freezing problems were widespread. This simply hasn't happened. There are many options available to sprinkler homes in freezing climates to combat the risks of frozen piping. These include, among others:

- Using sidewall sprinklers supplied by pipes running in walls, soffits, closets and crawl spaces to keep sprinkler piping out of unheated attics, or
- Properly installing piping beneath the insulation in attics to protect the piping from the unheated attic space. This technique has been used in climates as cold as Wrangle, Alaska to successfully sprinkler single family homes.

The Residential Fire Safety Institute documents that hundreds of jurisdictions in at least 25 states have adopted residential sprinkler legislation, including mountainous states and Northern states ranging from New York to Alaska. In addition, sprinkler systems are required in all residential occupancies governed by the IBC, which include group homes and townhouses exceeding 3-stories in height. The bottom line is that residential sprinkler systems have been installed in homes located in freezing climates for many years, and if freeze concerns are being addressed in these cases, as they must be, then homes sprinklered in accordance with the IRC can and will be handled in the same manner.

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2. Cost impact of inflated water tap fees: Opponents of residential sprinklers argue that sprinklers costs will skyrocket in jurisdictions where local water purveyors inflate the cost of larger water taps. Obviously, this is not a building code issue, and local fees should not serve as an impediment to national policy established by the IRC. Nevertheless, an experienced designer can avoid the use of a larger meter, and associated fee increases, by applying alternative design approaches that are already permitted by NFPA 13D. Such alternatives include:

- Using reduced sprinkler spacing in rooms protected by more than one sprinkler. UL listed sprinklers are already on the market for reduced spacing that only require 9 gpm per sprinkler. Given that NFPA 13D requires that a maximum of two sprinklers be calculated for dwelling systems, this yields a total demand of 18 gpm, which can be supplied by many municipal systems using a standard 5/8-inch meter. With this design approach, extended coverage sprinklers can still be used in rooms requiring only a single sprinkler. Although this design approach may not be the best choice for every case, it is particularly suited to smaller homes at the entry/affordable housing level.
- If the tap fees for larger supplies are substantially out of line, there is always an option available to install a small tank/pump system supplied by a standard size water tap. Obviously, this option comes with its own associated cost, but it does provide an upper limit to the potential impact of high tap fees.

The options listed above are available today, and they meet NFPA 13D. Obviously, the most effective approach to fighting unfairly high tap fees is to encourage that the fees be reduced when increased meter sizes are being used to support the installation of a fire sprinkler system. Mandating sprinklers will put builders and code officials on the same side of this issue, trying to get affordable sprinklers, rather than arguing over whether sprinklers should be provided. The home building industry could be using its powerful political contacts to reduce the costs of tap fees rather than resisting the efforts to install fire sprinklers.

For such an effort to be successful, water purveyors will need to understand that increasing meter/tap sizes to supply residential sprinklers does not increase the demand on a public water system. On the contrary, residential sprinklers actually reduce demand because sprinklers only flow water when a fire occurs, and the amount of water used by a residential fire sprinkler system is only a fraction of what firefighters use to extinguish fires in unsprinklered properties. This argument has already successfully resolved tap fee issues in some jurisdictions.

3. Cost of sprinklers and impact on affordable housing. Before specifically addressing the cost of sprinklers, there is a basic question that has to be asked when it comes to the price of housing in America, "What drives the price of a new home?" In many markets, the answer to this question is not "construction costs." Instead, prices are established based on an analysis of what the market will bear. In these markets, sales prices will continue to rise as long as there are buyers who are willing to pay the asking price, and in these markets, it would be disingenuous, at best, to suggest that the cost of fire sprinklers would price buyers out of the market.

In other segments of the home building industry, new home pricing does follow the "cost plus" model, and in these cases, the added cost of a sprinkler system is an important consideration. Such costs will be a function of many variables, including but not limited to, the availability of a public water supply, the size of the home, the level of competition in the local market, the design approach, the climate and enhancements that may be desired by the owner, such as custom colored cover plates for sprinklers.

One source of cost data associated with the widespread installation of residential sprinklers is available from Scottsdale, Arizona. Scottsdale, which became one of the first major U.S. jurisdictions to require residential sprinklers roughly 20 years ago, serves as an excellent demonstration case to show the effects of a community's decision to require residential sprinklers on system cost, life safety, property protection and the local fire-protection infrastructure. With respect to cost, residential sprinkler systems in Scottsdale were recently quoted as costing $0.55 to $0.75 per square foot, and there are now well over 40,000 sprinklered homes in the city. No one is suggesting that every other jurisdiction where residential sprinklers are required will match Scottsdale's cost structure, but Scottsdale's experience clearly demonstrates that a competitive marketplace greatly reduces sprinkler costs.

Technology, creative design approaches and labor charges also impact these costs. Multipurpose systems, which are already permitted by NFPA 13D, have been shown to be particularly well suited to certain types of homes because they add minimal cost to the plumbing installation. Recent surveys of sprinkler costs for affordable homes in the 1,000 to 1,200 square foot range showed that the added cost of materials related to sprinkler protection was in the $0.25 to 0.30 per square foot range, and the sprinkler installation required less than 8 hours of additional labor. While no cost increase is inconsequential when dealing with affordable housing, the significant fire safety benefits gained by installing sprinklers for such a small cost (in the $4/month range on a 30-year mortgage, not including any insurance or tax credit) certainly appears to be money well invested.

With respect to the cost of sprinklers in larger homes, the actual impact of sprinkler costs on the owner's monthly payment isn't much different. Figuring the cost of a hypothetical $3,000 sprinkler system in a $300,000 home with a 6.5% mortgage, a 5% credit on a $2,000/year insurance bill, and a combined Federal/State income tax rate of 33%; the net cost of fire sprinklers, after mortgage related tax deductions, would be $4.37 per month. This represents a 0.23% increase in the monthly payment and roughly equates to the cost of a premium beverage at Starbucks. The total cost on an annual basis would be $52.44, which would easily be offset by insurance reductions.

With all of the foregoing information in mind, it seems fair to say that the true impact on the housing market associated with requiring residential sprinklers will be far less than what opponents of residential sprinklers would like code officials to believe. It has been demonstrated many times in the many jurisdictions throughout the country where residential sprinklers are required that housing markets are not affected by fire sprinklers. These local experiences show us that, once the IRC requires residential sprinklers, home building will continue as it always has. Home prices will fluctuate based on the law of supply and demand; home builders will adjust their products to meet consumer preferences and trends; and home buyers will continue to buy homes.

For a full cost/benefit analysis of the impact of sprinklers on society, see the article, "Cost/Benefit to Society for Having Sprinklers in One and Two Family Dwellings – A Pessimistic Analysis", written by Kenneth E. Isman, P.E. for *SQ Magazine* in the Fall 2005 issue. It should be noted that the article is not designed to show what the fire sprinkler industry thinks will happen if all one and two family dwellings are sprinklered. Instead, the article was written to show that sprinklers still make sense, from a cost/benefit perspective, even if all of the pessimistic assumptions of the homebuilders are correct such as the assumption that fires only occur in older homes. If a more realistic approach is taken, then the benefits for fire sprinklers far outweigh the costs.

4. Does the public want residential sprinklers? Opponents of residential sprinklers have suggested that the general public, which isn't well represented at code hearings, would oppose residential sprinklers, but a recent national poll conducted by Harris Interactive indicates that this claim misrepresents public opinion. The survey of over 1,000 adults revealed that:

- 45% of homeowners said that a sprinklered home is more desirable than an unsprinklered home,
- 69% of homeowners said that having a fire sprinkler system increases the value of a home, and
- 38% of homeowners said that they would be more likely to purchase a home with fire sprinklers than without. The reason that this number isn't higher appears largely tied to an unfounded fear of water damage. 48% of homeowners cited water damage as the reason they would not want to install a sprinkler system. Clearly, this indicates a need for public education on the operation and reliability of sprinkler systems as being a major component in enhancing public support and demand for sprinklers.

The results of this survey support the assertion that the general public has become aware of and has warmed up to the concept of residential sprinklers. Certainly, this is due, at least in part, to the fact that many homeowners live in multifamily occupancies before they own a one- or two-family dwelling. Now that the IBC requires all new multi-family dwellings to be sprinklered, it is fair to say that the home-buying public will continue to become more familiar with residential sprinklers and that public support for residential fire sprinkler systems will continue to grow.

5. Correlation between a home's age and fire risk...aren't homes built to the IRC already safe enough? Opponents of residential sprinklers would like to convince us that residential fire deaths are a function of a home's age and that new homes, built in accordance with the IRC, are safe. Many people buy these arguments because, on the surface, they seem to make sense. However, further analysis paints a different picture.

First, most residential fires deaths result from fires caused directly or indirectly by people. Compliance with the IRC doesn't prevent these types of fires or many other common fire causes, and once a fire starts, compliance with the IRC will not slow its spread. The speed by which a fire spreads in a home is instead a function of contents and room geometry.

Second, a simplistic correlation of residential fire deaths with the age of homes ignores several variables that tend to vary based on the age of a home. These include the socioeconomic status of the occupants, the density of occupants, the age of the occupants, and the presence or omission of smoke detectors (discussed separately below), among others. Fire safety experts know that these factors are far more likely to be contributory factors in fire deaths than the age of a structure. In addition, the fact that more fire deaths occur in "older" homes than newer homes may also be related to the fact that the median age of homes in the U.S., according to a recent HUD study, is 32 years. By sheer numbers, a lot of people live in older homes.

6. Since only a small percentage of fire department responses are for actual structure fires, does the fire service really need residential sprinklers? With respect to residential fire losses, the statistics submitted with last cycle's proposal clearly demonstrated the scope and magnitude of the residential fire problem in the United States. Although the percentage of emergency responses to residential structure fires is a small fraction of overall fire department responses, a shocking 45 percent of firefighter deaths that occur on the fire ground occur at residential occupancies, almost always 1- and 2-family dwellings. Dwelling fires have three characteristics that present disproportionate risks as compared to fires in other occupancies:

- First, they are typically well developed, post-flashover fires by the time the fire department arrives.
- Second, they often occur at night, and
- Third, they often involve a real or perceived need to perform search and rescue operations.

In short, dwelling fires represent a small percentage of our emergency responses but account for a very large percentage of firefighters who are killed in the line of duty.

It is also important to point out that the ability of the fire service to protect our communities by responding to residential fires has declined significantly in recent years, and the situation isn't getting better. The public has a relatively simple expectation with respect to the fire department when a fire happens...they call 911, and the fire department responds to rescue trapped occupants and put out the fire. Unfortunately, that expectation isn't being effectively met in many parts of the country because of dwindling resources.

Nationally, volunteer firefighters, who comprise 73% of the American fire service and protect the vast majority of the geographic area of the United States, are becoming harder and harder to retain. In New York alone, the ranks of volunteer firefighters have declined from 110,000 in the early 1990s to approximately 85,000 today. Considering that all-volunteer fire departments protect 95% of New York communities with a population of less than 10,000, what will happen when there are no longer enough firefighters to respond to 911 calls? This situation is national. It is not unique to New York.

Long after many home builders leave a community, the homes that they leave behind and the people who live in them continue to place demands on the fire service. While the fire service will always strive to meet those demands, it is unrealistic to expect that our volunteers will always be able to do so. Therefore, the fire services' message is simple...if the public is going to be protected from home fires; it's time that we build that protection into new construction.

7. Aren't smoke alarms enough? Homebuilders often suggest that smoke alarms are good enough to protect the public and that residential sprinklers aren't justified. Everyone can agree that smoke alarms save lives and that they are largely responsible for a reduction in the fire death rates that occurred over the past 30 years. Nevertheless, smoke alarms on their own do nothing to stop the spread of fire, protect property or protect firefighters.

Two other issues related to reliance on smoke alarms are of concern. First, as smoke alarms age, their reliability declines. This concern prompted smoke alarm manufacturers and testing laboratories to begin stamping an expiration date on each unit indicating a 10-year replacement cycle. How many alarms will actually be replaced at 10-year intervals, and what will happen to the reliability of alarms that are not replaced? Although an estimated 96% of U.S. homes with telephones now have at least one smoke alarm, in ¼ of reported fires in smoke alarm equipped homes, the devices didn't work.

The second issue related to the effectiveness of smoke alarms in further reducing fire death rates has to do with their performance and waking effectiveness. In a study that was just completed in 2006, only 58% of a test group of children ages 6-12 awakened when a standard smoke alarm sounded, and only 38% of the test group successfully evacuated. The median time to awaken was 3 minutes, and the median time to escape was the maximum allowed 5 minutes.

Another study revealed that a surprising 34% of fire deaths in one- and two-family dwellings during the 2000-2004 period occurred in homes with a working smoke detector. Perhaps this statistic correlates with the fact that fire death rates for the young and the elderly, those who are least likely to be capable of self-preservation even if they are awakened by a smoke detector, are roughly double those for individuals in the central age group. Smoke detectors are good, but they can only go so far in reducing the nation's fire death and injury rates. We need residential sprinklers.

8. What about homes without a public water supply? Opponents of residential sprinklers have suggested that it is impractical and too expensive to require sprinklers in homes that will use a well as the water supply. However, design options are available that make wells a viable water supply for both sprinklers and domestic service. Wells essentially fall into two categories, deep and shallow. With a shallow well, the well will likely be designed to provide a direct feed to the home, with no intervening tank. With these types of systems, pumps can be selected at reasonable costs that are capable of supplying both the domestic and sprinkler demands. Constant pressure, variable speed pumps are an excellent choice for this type of application.

One question that is frequently raised with respect to direct feed well systems involves the "recharge" rate, or the rate at which water can keep up with the required flow. Wells may not be capable of keeping up with the demand associated with a sprinkler system, which will typically be 20 gallons per minute or more. Many automatically assume that a tank and a secondary pump are necessary in these cases, greatly increasing the cost of the sprinkler system, but a lesser known yet simple approach called "developing the well" is a much better solution.

Developing a well essentially creates an underground cistern that replaces the need for a tank. The approach involves digging the well substantially below the water table and allowing the hole to fill with water, retaining the needed capacity underground. By using an appropriate pump with a developed well, an interior tank and pump arrangement can be avoided, and the water supply costs can be limited.

For deeper wells, there are two options. First, there are constant pressure, variable speed pumps suited for these applications. For installations utilizing this approach, a "developed well" as described above can also be used to accommodate needed water retention to satisfy the sprinkler demand.

The second alternative involves a tank and pump, which can be installed between the well pump and the plumbing system. This approach is the common arrangement utilized for deep wells supplying domestic service. To supply sprinklers simply requires that the size of the domestic supply tank be increased to something in the range of 200-300 gallons, and the secondary pump needs to have an increased flow rating. Both of these enhancements can be made at modest cost.

Some have suggested that the IRC should not require homes on wells to have fire sprinklers, yet homes in rural areas, usually corresponding to homes served by wells, are the homes that are least likely to survive a fire because of long or inadequate responses by the fire service. The solution is instead educating contractors on cost-efficient design options for well systems.

9. Impact of residential sprinklers on public and private water systems: It was suggested by one builder last cycle that the operation of residential sprinklers connected to a small water system resulted in the jurisdiction having to drain and decontaminate the entire water system. Subsequent identification and review of the cited event revealed that the concern regarding contamination of the water supply, which was a private system, was linked to the use of fire hydrants during suppression activities, not the sprinkler system. This clearly makes more sense, and for the record, the fire actually started outside of this building, spread to the interior, and sprinklers still helped to stop the fire's progress.

To suggest that the water demand caused by operation of a one- or two-family dwelling or townhouse sprinkler system will lead to contamination of an entire community water system is absurd and demonstrates a complete lack of understanding regarding residential sprinkler systems. The same logic would suggest that a single broken residential pipe, which would flow more water than operating sprinklers, would have the same result. Any water system that is this feeble has much bigger concerns than residential sprinklers.

The truth is that residential sprinklers actually result in a significantly decreased demand on water systems because residential sprinklers use far less water than firefighters to extinguish a fire. Scottsdale, Arizona's experience provides data to support this claim. Scottsdale found that the average estimated sprinkler flow per residential fire incident was 341 gallons, as compared to an estimated manual suppression flow for unsprinklered residential fire incidents of 2,935 gallons.

10. Wait for more cost-effective approaches to residential sprinkler protection before adopting a requirement in the IRC. Opponents of residential sprinklers suggest that we should hold off on requiring such systems in dwellings until improvements in technology make the systems more cost effective. The truth is that many recent improvements in sprinkler technology have largely improved cost effectiveness already. The real problem isn't a lack of cost effective design and installation options.

Instead, the problem appears to stem from a lack of communication within the supply, design and installation communities regarding these efficient design options and the fact that momentum often drives us to continue doing things the way we've done them in the past. To drive the industry toward more innovative solutions, more competition is needed, and changing the IRC to require residential sprinklers will create the demand that will increase competition and motivate cost efficient designs.

Market demand will also drive the creation of design tools that will simplify the exercises of locating sprinklers and sizing pipe. These tools, which will present design requirements in prescriptive, cookbook formats, have already been developed, and are being used in communities like Prince Georges County, Maryland, with a great deal of success for well over ten years. It is expected that they can easily become national in scope as more communities adopt the IRC.

11. Required maintenance: Opponents of residential sprinklers have stated that residential sprinkler systems need regular maintenance and questioned who would perform this service. Someone suggested that local fire departments will have to perform or verify maintenance, potentially raising concerns regarding right of entry.

The fact is that residential sprinkler systems are essentially maintenance free. The owner just needs to be taught what NOT to do. Don't close the valve, don't paint the sprinklers and don't hang clothes from sprinklers. Multipurpose systems are essentially tested every time the domestic water is used. For systems with water flow alarms (not required by NFPA 13D, but installed on some systems) the alarm can easily be tested by the homeowner by turning a valve to create some flow and seeing if the alarm sounds. The test is hardly rocket science and is no more complicated than testing a burglar alarm or replacing a furnace filter, operations that homeowners perform regularly. None of this maintenance would need to be performed or witnessed by the fire department.

12. Trained labor/inspectors: Opponents of residential sprinklers have suggested that, if the IRC were to require residential sprinklers, there would be a shortage of trained labor and trained inspectors to install and inspect these systems. This subject is not a legitimate concern. The fire sprinkler industry has always responded to the increased demand created by code requirements. In the seven years between 1992 and 1999, the fire sprinkler industry doubled in size (going from approximately 20 million sprinklers installed each year to 40 million sprinklers installed). During this time, the industry kept pace with demand, adding additional people to the labor force. There is no doubt that the sprinkler industry can continue to respond to the increase in demand. Once the IRC has been revised, it will take several years for jurisdictions to begin to adopt and enforce the 2009 edition. Some jurisdictions will not choose to adopt the sprinkler requirements, so the impact on the industry will be gradual. There is no question that the demand will be met by the industry as the IRC is changed, adopted and implemented at the local level.

Preliminary discussions have already taken place with the ICC and other certification bodies regarding the possibility of having specific certification programs for installers of residential sprinkler systems and local inspectors that would review and approve the installations. Training programs are underway to take people with a general knowledge of pipe fitting and teach them the additional important requirements for residential fire sprinkler systems, so that all of the installations meet NFPA 13D.

13. Leakage and mold damage: Opponents of residential sprinklers have expressed fear that sprinklers would leak and cause mold damage, which could make a home uninsurable. In response, it should be pointed out that residential sprinkler systems are no different than residential plumbing. If quality products are used and the system is properly installed, it won't leak.

With respect to sprinkler systems, sprinkler piping and fittings, and sprinklers themselves, are subject to rigorous testing to ensure quality. Unquestionably, sprinklers are far higher quality and more thoroughly tested than domestic piping and fixtures. Sprinkler tests required for listing include, among other requirements, a 700 psi hydrostatic strength test, a 500 psi leakage resistance test, a 100,000 cycle water hammer resistance test, a 35-125°F temperature cycling test, and a freeze performance test to -20°F for 24 hours. Also, sprinkler piping and components are rated for a pressure of 175 psi, while plumbing water supply systems are rated for only 80 psi.

14. Appendix P, good enough for now? Opponents of residential sprinklers have suggested that the IRC Appendix P is fairly new and that we should wait to see what happens with it. Unfortunately, this dodges the issues at hand.

When a local jurisdiction goes to adopt Appendix P, the first statement that the local homebuilders make during the hearings is, "Appendix P isn't necessary or important. After all, if sprinklers were really necessary, they would have put them in the body of the code rather than the Appendix." So, the homebuilders end up playing both sides of the fence. At the IRC hearings, they point to Appendix P and use that as justification to keep the requirements for sprinklers out of the code. Then, at the local hearings, they point to the fact that the requirements are in the Appendix as a reason not to mandate sprinklers.

Another reason that we need sprinklers in the body of the standard rather than the Appendix is that the benefits to society become significantly greater when all homes are sprinklered. With the rule in the Appendix, there will be some jurisdictions that don't pass the requirement, leaving these communities unprotected and the public will not be able to reap the benefits (in fact, they may never even know what they are missing). But with the requirements in the body of the IRC, people may debate removing them when they adopt the IRC, but at least they will have some sense of what they are losing.

A third reason that we need the requirements for sprinklers in the body of the IRC rather than the Appendix is that the fire service and the fire sprinkler industry can't bring experts to the debate in every local jurisdiction. There are tens of thousands of jurisdictions where this debate might occur and the homebuilders are going to have their local representatives loaded for these hearings. The fire service and the fire sprinkler industry just don't have the money or the personnel to compete with the homebuilders on a dollar-for-dollar basis. The debate as to the right level of fire protection for a home should be at the national level, with all of the national experts. The right decision (to put sprinklers in homes) should be done at the national level in the body of the code. Then, if people want to modify the code at the local level and take sprinklers out, they do so at their own peril and without the recommendations of the national experts.

Putting the sprinkler requirement into the body of the IRC certainly won't end the local debate, but it will at least put the burden on the home building industry to justify making an amendment to take sprinklers out. Other codes including the Uniform Fire Code, the NFPA Building Code and the Life Safety Code have already set a moral precedent by adding mandatory dwelling sprinkler requirements in their 2006 editions. The IBC and IFC have also done their parts by now requiring all residential occupancies within their respective scopes to be protected by fire sprinklers. Now it is time for the IRC to catch up.

Conclusion: Unlike many issues that we face at code hearings, THIS change strikes directly at the heart of America's fire problem. Opponents of residential sprinklers have a record of fighting just about every initial effort to improve dwelling safety. The same groups initially fought against smoke detectors, ground fault interrupters and mandatory sprinklers in multi-family residential occupancies. On each of these topics, code officials heard the same predictions of gloom and doom, but once the codes moved forward to require these features, the home building industry proceeded without so much as a detectible bump in the road. As years passed, prices for all of these features declined, some dramatically, and technology advanced to create better, yet less expensive products.

Reason (Dean): The life safety hazards in one- and two-family occupancies are clear: Between the years of 2000 and 2004 there was an average of 375,200 reported home structure fires resulting in 2,970 civilian deaths, 14,390 civilian injuries and $5.6 billion dollars in direct property damage per year[i] These losses and deaths far exceed any of the other occupancy types. 75% of reported home structure fires and 87% of total fire deaths occurred in the one- and two-family dwelling environment[ii]

The ICC documents provide much more onerous code requirements for occupancy types other than the one- and two-family dwelling. These other occupancy types have significantly less fire death and loss history, yet they are provided with greater protection. Based on the current code requirements, the protection levels in the IRC do not match the life safety hazards in the one and two-family dwelling environment.
In the year 2006, 39% of all fireground firefighter deaths occurred in dwellings and apartments[iii] At the 2006 Code Development Hearing in Orlando, the Committee disapproved the original proposal put forward and at the May 2007 Rochester Final Action Hearing, the membership heard many of the same arguments. The following paragraphs identify and respond to the concerns raised at both hearings. With these issues addressed, NASFM encourages the support of all code officials in supporting this code change.

1. Does the public want residential sprinklers? Opponents of residential sprinklers suggested in Orlando that the general public, which isn't well represented at code hearings, would oppose residential sprinklers, but a recent national poll conducted by Harris Interactive indicates that this claim misrepresents public opinion. The survey of over 1,000 adults revealed that:

- 45% of homeowners said that a sprinklered home is more desirable than an unsprinklered home, • 69% of homeowners said that having a fire sprinkler system increases the value of a home, and
- 38% of homeowners said that they would be more likely to purchase a home with fire sprinklers than without. The reason that this number isn't higher appears largely tied to an unfounded fear of water damage. 48% of homeowners cited water damage as the reason they would not want to install a sprinkler system. Clearly, this indicates a need for public education on the operation and reliability of sprinkler systems as being a major component in enhancing public support and demand for sprinklers.

The results of this survey support the assertion that the general public has become aware of and has warmed up to the concept of residential sprinklers. Certainly, this is due, at least in part, to the fact that many homeowners live in multifamily occupancies before they own a one- or two-family dwelling. Now that the IBC requires all new multi-family dwellings to be sprinklered, it is fair to say that the home-buying public will continue to become more familiar with residential sprinklers and that public support for residential fire sprinkler systems will continue to grow.

2. Correlation between a home's age and fire risk...aren't homes built to the IRC already safe enough?: Opponents of residential sprinklers would like to convince us that residential fire deaths are a function of a home's age and that new homes, built in accordance with the IRC, are safe. Many people buy these arguments because, on the surface, they seem to make sense. However, further analysis paints a different picture.
First, most residential fires deaths result from fires caused directly or indirectly by people. Compliance with the IRC doesn't prevent these types of fires or many other common fire causes, and once a fire starts, compliance with the IRC will not slow its spread. The speed by which a fire spreads in a home is instead a function of contents and room geometry.
Second, a simplistic correlation of residential fire deaths with the age of homes ignores several variables that tend to vary based on the age of a home. These include the socioeconomic status of the occupants, the density of occupants, the age of occupants, and the presence or omission of smoke detectors (discussed separately below), among others. Fire safety experts know that these factors are far more likely to be contributory factors in fire deaths than the age of a structure. In addition, the fact that more fire deaths occur in "older" homes than newer homes may also be related to the fact that the median age of homes in the U.S., according to a recent HUD study, is 32 years. By sheer numbers, a lot of people live in older homes. In summary, we do not debate that a home built in accordance with the IRC is safe, but that changes when people move in.

3. Since only a small percentage of fire department responses are for actual structure fires, does the fire service really need residential sprinklers? With respect to residential fire losses, the statistics submitted clearly demonstrate the scope and magnitude of the residential fire problem in the United States. Although the percentage of emergency responses to residential structure fires is a small fraction of overall fire department responses, a shocking 45 percent of firefighter deaths that occur on the fire ground occur at residential occupancies, almost always 1- and 2-family dwellings. Dwelling fires have three characteristics that present disproportionate risks as compared to fires in other occupancies. First, they are typically well developed, post-flashover fires by the time the fire department arrives. Second, they often occur at night, and third, they often involve a real or perceived need to perform search and rescue operations. In short, dwelling fires represent a small percentage of our emergency responses but account for a very large percentage of firefighters who are killed in the line of duty.

It is also important to point out that the ability of the fire service to protect our communities by responding to residential fires has declined significantly in recent years, and the situation isn't getting better. The public has a relatively simple expectation with respect to the fire department when a fire happens...they call 911, and the fire department responds to rescue trapped occupants and put out the fire. Unfortunately, that expectation isn't being effectively met in many parts of the country because of dwindling resources.

Nationally, volunteer firefighters, who comprise 73% of the American fire service and protect the vast majority of the geographic area of the United States, are becoming harder and harder to retain. In New York alone, the ranks of volunteer firefighters have declined from 110,000 in the early 1990s to approximately 85,000 today. Considering that all volunteer fire departments protect 95% of New York communities with a population of less than 10,000, what will happen when there are no longer enough firefighters to respond to 911 calls? This situation is national

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and is not unique to New York. Long after many home builders leave a community, the homes that they leave behind and the people who live in them continue to place demands on the fire service. While the fire service will always strive to meet those demands, it is unrealistic to expect that our volunteers will always be able to do so. Therefore, the fire services' message is simple…if the public is going to be protected from home fires, it's time that we build that protection into new construction.

4. Aren't smoke alarms enough? Homebuilders who testified at the Orlando hearing suggested that smoke alarms are good enough to protect the public and that residential sprinklers aren't justified. Everyone can agree that smoke alarms save lives and that they are largely responsible for the dramatic reduction in fire death rates that has occurred in the U.S. over the past 30 years. Nevertheless, smoke alarms are only life-safety devices. On their own, they do nothing to stop the spread of fire, protect property or protect firefighters.

Two other issues related to reliance on smoke alarms are of concern. First, as smoke alarms age, their reliability declines. This concern prompted smoke alarm manufacturers and testing laboratories to begin stamping an expiration date on each unit indicating a 10-year replacement cycle. The questions before us are how many alarms will actually be replaced at 10-year intervals, and what will happen to the reliability of alarms that are not

replaced? Although an estimated 96% of U.S. homes with telephones now have at least one smoke alarm, in ¼ of reported fires in smoke alarm equipped homes, the devices didn't work.

In contrast, residential sprinkler systems have a life expectancy of 50-years, and they require essentially no maintenance, particularly for multipurpose systems. With these systems, if the domestic water is turned on, sprinklers are on as well. With the combination of sprinklers and smoke alarms, homeowners will have the best of both technologies. The second issue related to the effectiveness of smoke alarms in further reducing fire death rates has to do with their performance and waking effectiveness. In a study that was just completed in 2006, only 58% of a test group of children ages 612 awakened when a standard smoke alarm sounded, and only 38% of the test group successfully evacuated. The median time to awaken was 3 minutes, and the median time to escape was the maximum allowed 5 minutes. Another study revealed that a surprising **34% of fire deaths in one- and two-family dwellings during the 2000-2004 period occurred in homes with a working smoke detector**. Perhaps this statistic correlates with the fact that fire death rates for the young and the elderly, those who are least likely to be capable of self-preservation

even if they are awakened by a smoke detector, are roughly double those for individuals in the central age group. Smoke detectors are good, but they can only go so far in reducing the nation's fire death and injury rates. We need residential sprinklers.

5. What about homes without a public water supply? Opponents of residential sprinklers have suggested that it is impractical and too expensive to require sprinklers in homes that will use a well as the water supply. However, design options are available that make wells a viable water supply for both sprinklers and domestic service. Wells essentially fall into two categories, deep and shallow. With a shallow well, the well will likely be designed to provide a direct feed to the home, with no intervening tank. With these types of systems, pumps can be selected at reasonable costs that are capable of supplying both the domestic and sprinkler demands. Constant pressure, variable speed pumps are an excellent choice for

this type of application.

One question that is frequently raised with respect to direct feed well systems involves the "recharge" rate, or the rate at which water can keep up with the required flow. Wells may not be capable of keeping up with the demand associated with a sprinkler system, which will typically be 20 gallons per minute or more. Many automatically assume that a tank and a secondary pump are necessary in these cases, greatly increasing the cost of the sprinkler system, but a lesser known yet simple approach called "developing the well" is a much better solution. Developing a well essentially creates an underground cistern that replaces the need for a tank. The approach involves digging the well substantially below the water table and allowing the hole to fill with water, retaining the needed capacity underground. By using an appropriate pump with a developed well, an interior tank and pump arrangement can be avoided, and the water supply costs can be limited.

For deeper wells, there are two options. First, there is constant pressure, variable speed pumps suited for these applications. For installations utilizing this approach, a "developed well" as described above can also be used to accommodate needed water retention to satisfy the sprinkler demand. The second alternative involves a tank and pump, which can be installed between the well pump and the plumbing system. This approach is the common arrangement utilized for deep wells supplying domestic service. To supply sprinklers simply requires that the size of the domestic supply tank be increased to something in the range of 200-300 gallons, and the secondary pump needs to have an increased flow rating. Both of these enhancements can be made at modest cost. Some have suggested that the IRC should not require homes on wells to have fire sprinklers, yet homes in rural areas, usually corresponding to homes served by wells, are the homes that are least likely to survive a fire because of long or inadequate responses by the fire service. The solution is instead educating contractors on cost-efficient design options for well systems.

6. Impact of residential sprinklers on public and private water systems: It was suggested by one builder during testimony at the Orlando hearing that operation of residential sprinklers connected to a small water system in a Michigan jurisdiction resulted in the jurisdiction having to drain and decontaminate the entire water system. Subsequent identification and review of the cited event revealed that the concern regarding contamination of the water supply, which was a private system, was linked to the use of fire hydrants during suppression activities, not the sprinkler system. This clearly makes more sense, and for the record, the fire actually started outside of this building, spread to the interior, and sprinklers still helped to stop the fire's progress.

To suggest that the water demand caused by operation of a one- or two-family dwelling or townhouse sprinkler system will lead to contamination of an entire community water system is absurd and demonstrates a complete lack of understanding regarding residential sprinkler systems. The same logic would suggest that a single broken residential pipe, which would flow more water than operating sprinklers, would have the same result. Any water system that is this feeble has much bigger concerns than residential sprinklers.

The truth is that residential sprinklers actually result in a significantly decreased demand on water systems because residential sprinklers use far less water than firefighters to extinguish a fire. Scottsdale, Arizona's experience provides data to support this claim. Scottsdale found that the average estimated sprinkler flow per residential fire incident was 341 gallons, as compared to an estimated manual suppression flow for unsprinklered residential fire incidents of 2,935 gallons.

7. Wait for more cost-effective approaches to residential sprinkler protection before adopting a requirement in the IRC. Opponents of residential sprinklers suggest that we should hold off on requiring such systems in dwellings until improvements in technology make the systems more cost effective. The truth is that many recent improvements in sprinkler technology have largely improved cost effectiveness already. The real problem isn't a lack of cost effective design and installation options. Instead, the problem appears to stem from a lack of communication within the supply, design and installation communities regarding these efficient design options and the fact that momentum often drives us to continue doing things the way we've done them in the past.

To drive the industry toward more innovative solutions, more competition is needed, and changing the IRC to require residential sprinklers will create the demand that will increase competition and motivate cost efficient designs.

Some have suggested that we should wait for NFPA 13D or the IRC to permit the use of a single operating sprinkler as a design basis, as opposed to the currently required two sprinklers, before requiring sprinklers in the IRC. Some have also suggested that we should revisit whether sprinklers are really needed everywhere NFPA 13D requires them before requiring residential sprinklers in the IRC. The best way to encourage research and discussion on both of these ideas is to pass the IRC requirement now. Market demand will drive the research and interest in residential sprinklers will grow.

Market demand will also drive the creation of design tools that will simplify the exercises of locating sprinklers and sizing pipe. These tools, which will present design requirements in prescriptive, cookbook formats, are already being developed, and it is expected that they will be published prior to publication of the 2009 IRC.

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8. Required maintenance: Opponents of residential sprinklers stated in Orlando that residential sprinkler systems need regular maintenance and questioned who would perform this service. Someone suggested that local fire departments will have to perform or verify maintenance, potentially raising concerns regarding right of entry.

The fact is that residential sprinkler systems are essentially maintenance free. Multipurpose systems have no maintenance requirements at all, and stand-alone systems only require an occasional test of the water flow alarm, if provided (not required by NFPA 13D or the IRC when the sprinkler pipe is copper, CPVC, or PEX) and the backflow preventer, if provided (again, not required by NFPA 13D). None of this maintenance would be performed or witnessed by the fire department. The alarm test can be conducted by the owner, in the same way the owner may periodically test a burglar alarm, and a plumber is required to test a backflow preventer. This test, which is a public health issue, is not associated with functionality or reliability of the sprinkler system, and therefore, it is not a fire safety concern.

9. Trained labor/inspectors: Opponents of residential sprinklers suggested in Orlando that, if the IRC were to require residential sprinklers, there would be a shortage of trained labor and trained inspectors to install and inspect these systems. While that is true today, there is no doubt that industry and code officials will respond once the IRC has been revised, and there will be several years to ramp up before the 2009 IRC begins to have an impact. This is exactly what has happened in the many local jurisdictions that have passed sprinkler ordinances.

Preliminary discussions have already taken place with ICC regarding the possibility of having ICC oversee a certification program for residential sprinkler installers and inspectors. Other organizations have also expressed interest in handling installer training and certification. It is expected that, in some jurisdictions, plumbers will become trained and certified to install residential sprinklers and sprinklers will be installed as part of the plumbing

system. Likewise, it is expected that, in some jurisdictions, plumbing inspectors will be trained and certified to inspect these systems. This model is not unlike the approach taken with smoke alarms. They are located and installed by electricians and they are inspected by the electrical or building inspector.

10. Leakage and mold damage: In Orlando, opponents of residential sprinklers expressed fear that sprinklers would leak and cause mold damage, which could make a home uninsurable. In response, it should be pointed out that residential sprinklers systems are no different than residential plumbing. If quality products are used and the system is properly installed, it won't leak. If substandard products are used or workmanship is faulty, leaks will occur.

With respect to sprinkler systems, sprinkler piping and fittings, and sprinklers themselves, are subject to rigorous testing to ensure quality. Unquestionably, sprinklers are far higher quality and more thoroughly tested than domestic piping and fixtures. Sprinkler tests required for listing include, among others, 700 psi hydrostatic strength, 500 psi leakage resistance, 100,000 cycles water hammer resistance, 35-125°F temperature cycling, and freeze performance to 20°F below for 24 hours. Also, sprinkler piping and components are rated for a pressure of 175 psi, while plumbing water supply systems are rated for only 80 psi.

11. Appendix P, good enough for now? Opponents of residential sprinklers suggested in Orlando that, with the IRC having just accepted Appendix P, maybe it would be best to leave the sprinkler requirements in the appendix for a while to see what happens with it. This approach will certainly be appealing to some because it delays the sprinkler issue and gives home builders a leg up in fighting sprinklers at the local level.

However, isn't it time that we give local code officials the leg up? Code officials who have been through the local adoption process will certainly understand that it's much easier to justify taking something controversial out of the code than to add something new during an adoption review. With respect to residential sprinklers, code officials know all too well that arguing them into the code at the local level is a very uphill climb given local politics and the strength of local home builder associations.

Putting the sprinkler requirement into the body of the IRC certainly won't end the local debate, but it will at least put the burden on the home building industry to justify making an amendment to take sprinklers out. Local code officials would then have a respectable chance of keeping the sprinkler requirement. Other codes including the Uniform Fire Code, the NFPA Building Code and the Life Safety Code have already set a moral precedent by adding mandatory dwelling sprinkler requirements in their 2006 editions. The IBC and IFC have also done their parts by now requiring all residential occupancies within their respective scopes to be protected by fire sprinklers. Now it is time for the IRC to do the same.

i Ahrens, 2007, p. 2
ii Ibid.
iii Fahy & Leblanc, 2007, p. 24

Cost Impact (Stanek): The code change proposal will have the effect of a minor increase in the cost of construction in the short term that will be recouped in the long run due to other savings that more than offset the costs. See the Cost/Benefit analysis submitted with this proposal.

Cost Impact (Dean): The code change proposal will increase the cost of construction.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Rick Davidson, City of Maple Grove, MN, representing Association of Minnesota Building Officials, requests Approval as Modified by this Public Comment.

Modify proposal as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. An approved automatic fire sprinkler system shall be installed, repaired, operated and maintained in new one-and two-family dwellings and townhouses in accordance with NFPA 13D when required by the *International Fire Code*. Separate permits shall be obtained for installation, repair, operation and maintenance when required by the *International Fire Code*.

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification places the authority for permitting and enforcement of residential sprinklers in the Fire Code. It seems appropriate that sprinkler requirements be placed in the code of those who most support their installation. They are in the best position to defend their inclusion in the code when it comes to local adoption.

Analysis. Section 101.2 of the IBC refers to the IRC as a stand alone code. As such, the provisions of the IRC are self-contained, and the provisions for a building constructed in accordance with the IRC are contained solely within the scope of the IRC and not within the scope of any other I-Code. Therefore the modification proposed is outside the scope of the International Fire Code. Additionally, the proposed text in the modification cannot be applied, as there are no provisions in the International Fire Code that are applicable to the IRC. The requirements for sprinkler systems contained in the IFC are keyed to occupancy groups. Since a building built in accordance with the IRC has no occupancy classification, there is no linkage to buildings built in accordance with the IRC.

Public Comment 2:

John C. Dean, National Association of State Fire Marshals (NASFM), requests Approval as Modified by this public comment.

Sean DeCrane, International Association of Firefighters (IAFF), requests Approval as Modified by this Public Comment

Modify proposal as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. An approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with Section P2904 of the *International Residential Code or* NFPA 13D.

(Renumber subsequent sections)

(Portions of proposal not shown remain unchanged)

Commenter's Reason: This modification addresses the approval of proposal RP3 by the IRC Committee which provides for either an NFPA 13D sprinkler system or a dwelling sprinkler system installed in accordance with new provisions in IRC Section P2904.

Final Action: AS AM AMPC____ D

RB64-07/08
R313 (New), Appendix P, Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Ronny J. Coleman, Retired California State Fire Marshal, representing IRC Fire Sprinkler Coalition

1. Add new section as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. Effective January 1, 2011, an approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with NFPA 13D.

(Renumber subsequent sections)

2. Delete IRC Appendix P without substitution:

~~APPENDIX P~~
~~FIRE SPRINKLER SYSTEM~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA
13D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Reason: This proposal is submitted as part of a package of three proposals that were developed in cooperation with the International Association of Fire Chiefs with input from code officials, home builders, fire chiefs and other interested parties. During last year's code development cycle, many ICC members stated that the preferred way to advance fire sprinklers into new home construction is through a comprehensive approach that involves:

1. A schedule for implementation,
2. Reasonable and appropriate design and construction incentives, and
3. A simple, prescriptive methodology for designing systems.

In response, representatives of the IRC Fire Sprinkler Coalition (IRCFSC) and the International Association of Fire Chiefs have developed and submitted three proposals for this code cycle, one addressing each topic.

This proposal addresses the first issue, "a schedule for implementation." It requires new homes constructed after January 1, 2011 to have fire sprinklers. The delayed implementation date provides a time buffer that will allow for development of infrastructure, such as trained installers and inspectors, prior to the residential sprinkler requirement becoming effective. While the approach of delaying a code requirement may be unfamiliar to some, it is entirely appropriate, and it is already used by the IRC in Chapter 38, as follows:

> ***E3802.12 Arc-fault protection of bedroom outlets.*** *All branch circuits that supply 120-volt, single-phase, 15- and 20-ampere outlets installed in bedrooms shall be protected by a combination type or branch/feeder type arc-fault circuit interrupter installed to provide protection of the entire branch circuit.* ***Effective January 1, 2008, such arc-fault circuit interrupter devices shall be combination type.*** *(emphasis added).*

It is common knowledge that fires in one- and two-family dwellings are the root of America's fire problem, and a substantial majority of ICC members who voted at last year's final action hearing, 56%, agreed that residential sprinklers are the right solution. To truly address America's fire problem, ICC members know that we must, at some point, begin to mainstream fire sprinklers into new home construction, and this proposal provides a rational way to make the transition by fixing a future date for the requirement to become effective.

During last year's debate, the IRCFSC provided detailed responses that addressed all of the concerns cited in testimony as a basis for opposing residential sprinklers. These concerns, which included the use of wells to supply sprinklers, freezing, leakage and cost, among others, were addressed in our public comment to proposal RB114-06/07 and in testimony offered at the final action hearing in Rochester. They were also addressed in a Web cast aired by the IRCFSC in May 2007, copies of which are now available on a free DVD that can be ordered at www.IRCFireSprinkler.org.

As a result of this outreach effort, opposition to sprinklers based on myths and misinformation has largely dissipated, and the debate has largely become focused on two issues; First, whether the requirement for fire sprinklers in dwellings should be determined at a local level, and second, whether the residential fire problem is limited to older homes. The remainder of this reason statement focuses on these two issues.

1. Should the requirement for fire sprinklers in dwellings be a local issue? Several speakers in Rochester who spoke in opposition to RB114 conveyed an opinion that requirements for fire sprinklers in dwellings should be decided at the local level. The question is why? By including Appendix P, the IRC has already acknowledged fire sprinklers as a basic safety feature that should be included in new homes. There is no premise for the IRC to promote residential fire safety on community-by-community basis. The IRC, as a model code, should promote safety and regulatory consistency among all jurisdictions, as opposed to creating a local "shopping list" of safety requirements.

No other ICC code treats sprinkler requirements or residential fire safety as a local choice to be made at the time of code adoption. The IBC establishes a baseline that ALL residential occupancies must be protected by fire sprinklers, including one- and two-family dwellings and townhouses. Some argue that it's appropriate for IBC to be more restrictive than the IRC because use of the IBC is only mandatory for dwellings exceeding three stories in height, but that argument disregards one very important fact; most residential fire deaths occur in one- and two-story homes. To have an impact on fire deaths in one- and two-story homes, we need a fire sprinkler requirement in the IRC.

A newly published study by the National Institute of Standards and Technology (NIST) entitled "Benefit-Cost Analysis of Residential Fire Sprinkler Systems," reports that, out of almost 2,000 fire incidents in homes equipped with fire sprinklers during the 4-year period 2002 to 2005, there were no fire-related fatalities. This statistic clearly demonstrates the potential for sprinklers to save thousands of lives that would otherwise be lost in residential fires. With the knowledge that residential fire sprinklers are a proven, life-saving technology, it is clear that the IRC should establish a model that sprinklers are a minimum safety feature that should be included in all new homes.

2. Is the residential fire problem limited to older homes?
According to a recent HUD study, the median age of homes in the U.S. is 32 years. With this in mind, it makes perfect sense that more fires and fire deaths occur in "older" homes, simply because there are many more of them. However, the residential fire problem is certainly not limited to older homes, and it is has not been correlated with home age.

To evaluate the relationship between the age of a home and fire risk, it is necessary break the concept of fire risk into its two components, the probability of a fire event occurring and the associated consequence once the event occurs. The probability of a fire event occurring equates to the risk of fire ignition. With respect to the age of a home, only those ignition sources that are permanently affixed to a home, such as central heating systems or electrical distribution systems, might be directly correlated to home age, but to date, there are no known studies demonstrating increased fire risk as these systems age. Such a study would be difficult to perform because heating and electrical systems are often replaced when a home is remodeled, breaking any correlation that might otherwise exist between the age of a home and the age of fixed systems installed therein. Nevertheless, because most fire deaths are associated with ignition scenarios related to human behavior, which are independent of home age, it is clear that home age has little to do with the probability of a fire event.

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With respect to consequences associated with a fire event, assuming that an ignition has occurred, it is again difficult to establish any correlation with home age, except to the extent that the probability of safe evacuation is increased based on the possible presence of working smoke alarms and/or escape windows. On the contrary, some design and construction methods commonly used in new homes actually reduce fire safety. These include the use of lightweight trusses (now used in more than 60% of new homes according to the Wood Truss Council of America), which are known to become unstable and collapse more quickly in fire situations than conventional construction; and open floor plans, which reduce compartmentation and allow a fire to quickly spread throughout a home.

The truth is that fire growth in a home is largely dependent on contents, not the structure itself, and contents are independent of home age. Although smoke alarms and escape windows associated with newer homes are beneficial in some fire incidents, statistics show that the value of these features is declining over time, as fire deaths in homes that have working smoke alarms are becoming increasingly common. The most recent data (for the period 2000 to 2004), shows that 34% of fire deaths occurred in homes that had WORKING smoke alarms. This is up from 24% in the previous period, and as smoke alarms age, we can only assume that their reliability will continue to decline unless they are periodically replaced, which seems to be wishful thinking when one considers that we have a problem even getting people to change batteries in smoke alarms on a regular basis.

In summary, a simple risk analysis demonstrates that home age is largely independent of either the risk of ignition or the consequences of a fire, if ignition occurs. Therefore, it is clear that home age has little to do with the residential fire problem or the need for residential sprinklers.

Conclusion:
The outpouring of support for residential sprinklers has been building for many years, and today, all U.S. model building codes require fire sprinklers in residential occupancies, including one- and two-family dwellings, with the exception of the IRC. It is only logical that the IRC should finally acknowledge the value of residential sprinklers in preventing deaths, injuries and property loss by making sprinklers a standard feature in new home construction.

Although some in the IRC arena have argued that "big government" shouldn't intrude into American homes by requiring fire sprinklers, those of us who have been around for a while will recall that this same argument was made 30-years ago when smoke alarms were first required in dwellings. Today, it's hard to imagine any reasonable individual arguing that the IRC requirement for smoke alarms constitutes a "government intrusion" into the American home, largely because smoke alarms are viewed as cost-effective safety devices. Sprinklers should be viewed the same way.

Given the proposed incentive package and prescriptive design option for multipurpose fire sprinkler systems being advanced this year in a proposal by the International Association of Fire Chiefs, it is entirely feasible that it will be cheaper to build some homes with fire sprinklers than without. For those cases where there is a net cost to sprinklers, NIST's newly published "Benefit-Cost Analysis of Residential Fire Sprinkler Systems" report concludes that multipurpose residential fire sprinkler systems are still a good investment, yielding a positive present value of net benefits (PVNB) for every home type studied, including ranch-style homes, colonial-style homes and townhouses.

This proposal provides a reasonable and justified approach for advancing fire sprinklers into the body of the IRC, and the time has come to for the IRC to include fire sprinklers as part of the model for residential construction.

ABOUT THE IRC FIRE SPRINKLER COALITION: The IRC Fire Sprinkler Coalition is an organization that represents national, state and regional groups of code officials and other associations focused on public safety. The Coalition has been active in presenting training programs to code officials and others aimed at conveying facts and debunking myths and misinformation about residential sprinklers. At the time of submittal of this proposal, groups who pledged to support the IRC Fire Sprinkler Coalition's mission of mainstreaming fire sprinklers into new home construction included:

NATIONAL AND REGIONAL COALITION MEMBERS
* International Association of Fire Chiefs – Fire and Life Safety Section
* Center for Campus Fire Safety
* ICC Joint Fire Service Review Committee
* Institution of Fire Engineers, US Branch
* International Fire Marshals Association
* National Association of State Fire Marshals
* New England Association of Fire Marshals
* New England Division of the International Association of Fire Chiefs
* Safe Buildings Coordinating Committee
* Society of Fire Protection Engineers
* Southeastern Association of Fire Chiefs
* Uniform Fire Code Association
* Western Fire Chiefs Association

STATE AND LOCAL COALITION MEMBERS

Alaska
* Alaska Fire Chiefs Association

Arizona
* Arizona Fire Chiefs Association
* Arizona Fire Marshals Association
* Arizona: Society of Fire Protection Engineers, Arizona Chapter
* Arizona: Yuma County, AZ Fire Officer's Association

California
* California: California Fire Chiefs Association
* California: Northern California Fire Prevention Officers Section
* California: Orange County Fire Chiefs Association
* California: Southern California Fire Prevention Officers Section

Colorado
* Colorado: Fire Marshals Association of Colorado

Connecticut
* Connecticut: Capitol Region Fire Marshals Association of Connecticut

Delaware
* Delaware: Fire Marshals Association of Delaware Valley

Florida
* Florida Fire Marshals and Inspectors Association
* Florida Fire Chiefs Association
* Florida: Northeast Florida Fire Prevention Association

Idaho
* Idaho Fire Chiefs Association
* Idaho Fire Prevention Officers Association

Illinois
* Illinois Fire Inspectors Association
* Illinois Fire Chiefs Association
* Illinois: Lake County Fire Chiefs Association

Indiana:
* Indiana: Fire Inspectors Association Of Indiana

Iowa
* Iowa: Hawkeye State Fire Safety Association, Iowa
* Iowa Fire Marshal's Association

Louisiana
* Louisiana Association of Fire Prevention Chiefs

Maryland
* Maryland Building Officials Association
* Maryland State Firemen's Association

Maine
* Maine Fire Chiefs Association

Massachusetts
* Massachusetts: Fire Chiefs Association of Massachusetts

Michigan
* Michigan Association of Fire Chiefs
* Michigan Fire Inspectors Society
* Michigan: Macomb County Fire Chiefs Association

Missouri
* Missouri: Tri-Lakes Fire Chiefs Association

Minnesota
* Minnesota: Fire Marshals Association of Minnesota

Nebraska
* Nebraska Municipal Fire Chiefs Association

Nevada
* Nevada: Fire Prevention Association of Nevada

New Jersey
* New Jersey Fire Prevention and Protection Association
* New Jersey: Northern Ocean Fire Chiefs Association
* New Jersey: Uniform Fire Prevention/Protection Officials Assn. of Ocean County

New Mexico
* New Mexico Fire Marshals Association

New York
* New York: Association of Fire Districts of the State of New York
* New York: Career Fire Chiefs' Association of New York State
* New York: Fire Marshals Association of Suffolk County
* New York: Firemen's Association of the State of New York
* New York: Monroe County, NY Fire Marshals & Inspectors Association
* New York State Association of Fire Chiefs
* New York State Building Officials Conference
* New York State Code Coalition to Protect and Preserve our Communities:
* New York State Fire Marshals and Inspectors Association
* New York: Suffolk County Fire Chiefs Association

North Carolina
* North Carolina State Firemen's Association

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Ohio
* Ohio Fire Officials Association

Oregon
* Oregon Fire Code Committee
* Oregon Fire Marshals Association

Pennsylvania
* Pennsylvania Fire and Emergency Services Institute

Rhode Island
* Rhode Island Association of Fire Marshals

Tennessee
* Tennessee Fire Safety Inspectors Association

Texas
* Texas Fire Marshals Association
* Texas: Fire Prevention Association of North Texas

Virginia
* Virginia: Central Virginia Fire and Arson Association
* Virginia Fire Chiefs Association
* Virginia Fire Prevention Association

Washington
* Washington Fire Chiefs Association
* Washington State Assn of Fire Marshals

Cost Impact: This code change will increase the cost of construction.

Analysis: This proposal includes an "effective date" which is typically not included in the I-Codes. Typically, the provisions in the code become effective when the code is adopted.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action:

Disapproved

Committee Reason: The committee felt that putting language into the code that mandated sprinklers on a future date, January 1, 2011, was a problem. The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now.

Assembly Action:

None

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Julius Ballanco, PE, CPD, President, American Society of Plumbing Engineers, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

SECTION R313
SPRINKLER PROTECTION

R313.1 Sprinklers. Effective January 1, 2011, all dwelling units shall be protected with an automatic residential fire sprinkler system.

Exception: Sprinkler protection shall not be required for additions or alterations of existing buildings that do not have an automatic residential fire sprinkler system installed.

R312.2 Design and installation. Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.

(Renumber subsequent sections)

Delete IRC Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

Add standard to Chapter 43 as follows:

NFPA 13D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Commenter's Reason: As stated in the original proposal, ASPE is a firm believer that residential sprinkler systems should be installed in all residential buildings to provide life safety. The fire deaths and statistic regarding the performance of NFPA 13D systems clearly justifies the requirements for residential sprinklers for all new residential buildings.

ASPE can agree with the IRC Fire Sprinkler Coalition regarding the delay in enactment of the code requirement. While we believe this should happen immediately, it is recognized that it could take time to complete the training and education of all parties involved. Therefore, we in effect are suggesting the combination of the two proposed code changes RB63 and RB64.

The purpose of the code is to provide life safety protection to everyone. To provide this protection, residential sprinklers are a necessary component in building construction.

Public Comment 2:

Ronny J. Coleman, Retired California State Fire Marshal, representing Fire Sprinkler Coalition, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

SECTION R313
SPRINKLER PROTECTION

R313.1 Required Installation. Effective January 1, 2011, a residential fire sprinkler system shall be installed in one- and two-family dwellings and townhouses.

Exception: A residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with a residential fire sprinkler system.

R312.2 Design and installation. Residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.

(Renumber subsequent sections)

Also RP3 - page 786

Delete IRC Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

Add standard to Chapter 43 as follows:

NFPA 13D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Commenter's Reason: It is important to point out that there was no comprehensive debate on this proposal at the hearing in Palm Springs. The IRC Fire Sprinkler Coalition (www.IRCFireSprinkler.org) and many others chose to forgo debate since it was clear, based on committee actions on prior proposals, that the committee would not accept any proposal having to do with residential sprinklers.

When RB64 was called to the floor, there were only 10 committee members present (other than the chairman), and 4 of these individuals were appointed by the National Association of Home Builders. Given NAHB's well-known policy of opposing residential sprinklers, passage of RB64 would have required a unanimous vote of the remaining 6 members. Such a requirement, the threshold of unanimity among committee members who don't have a pre-determined vote, to pass a code change is inconsistent with the concept of consensus code making, and it depreciates ICC's code-making process. Accordingly, the committee vote lacks merit and should be ignored.

We ask the ICC membership to support this public comment based on the overwhelming evidence that has been presented in support of residential sprinklers over the past few years. The reason statement provided with the original RB64 proposal and the reason statements provided with many other proposals this year clearly make the case that residential sprinklers represent the best way to achieve a sustainable and long-term reduction in residential fire losses.

We know that: 1) the residential fire problem is not limited to older homes, 2) the residential fire problem cannot be solved with smoke alarms, 3) more firefighters are killed fighting fires in dwellings than in any other occupancy, and 4) residential sprinklers represent a cost effective solution to America's residential fire problem. These conclusions are clearly documented in publicly available reports.

We also know that consumers are accepting residential sprinklers as an important feature in new home construction in increasing numbers. This comes as no surprise because the IBC requires EVERY other residential occupancy built today to have sprinklers, and it simply makes sense that renters who live in sprinklered apartments will want to move into sprinklered homes.

While NAHB suggests that sprinklers should remain a "choice" for new homeowners, the concept of choice has two significant flaws. First, it's common knowledge that major home builders won't offer sprinklers even if the owner wants them installed, so home buyers who want sprinklers are simply told that they're not offered as an option. Second, why should the first home buyer be given the right to choose whether a home gets a fire sprinkler system, on behalf of all future homeowners, their families, and the community who ultimately assumes responsibility for providing fire protection for unsprinklered properties? This simply makes no sense.

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The fact that the National Association of Home Builders is the only national organization to oppose the adoption of residential sprinklers as a mainstream feature in new home construction is very telling, and we are optimistic that ICC's membership will make the decision that the time has finally come for all homes to be sprinklered. It seems that everyone agrees that we'll eventually get there, so what are we waiting for?

Final Action: AS AM AMPC 2 D

RB65-07/08

R325 (New), Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Jim Jorgensen/Greg Reed, City of Lenexa, KS

1. Add new section as follows:

SECTION R325
AUTOMATIC SPRINKLER SYSTEM

R325.1 Fire protection systems. An automatic residential fire sprinkler system shall be installed in new townhouses in accordance with NFPA 13D.

2. Add standard to Chapter 43 as follows:

NFPA
13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: Townhouses present a unique fire protection and property protection issues for fore departments and owners of connected townhouses. With separate ownerships townhouses are uniquely affected by fires in adjacent units even if the fire does not breach the two hour walls separating the units. After a severe fire the structure is open to the elements and subject to damage from water intrusion and other effects. These detrimental effects contribute to ongoing damage of adjacent townhouses since the process for repair may take an extended period of time. Legal issues may further complicate the repair process. Adding sprinklers will minimize the extent of damage so that repairs are easier to complete and the time of exposure of adjacent units to adverse affects is minimized.

Significant documentation was provided RB114-06/07 to show that non-sprinkled dwellings are a major contributing factor to the amount of property damage and loss of life from fires. Sprinkling is now required for all multi-family dwellings and townhouses should be treated in a similar manner.

Cost Impact: The code change proposal will increase the cost of construction.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now. The committee agreed that if the code is going to mandate sprinklers for new construction that is should apply to all structures in the scope of the *International Residential Code* not just townhouses in a piecemeal approach.

Assembly Action: **Approved as Submitted**

Individual Consideration Agenda

This item is on the agenda for individual consideration because an assembly action was successful.

Final Action: AS AM AMPC____ D

RB66-07/08

R101.2, R301.1.3.1 (New), R313 (New), R317.2, R317.2.4, R310.1, AP102 (New), Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Rick Morris, AvalonBay Communities, Inc.

1. Revise as follows:

R101.2 (Supp) Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above-grade in height with a separate means of egress and their accessory structures.

The provisions of this Code shall also apply to the construction, alteration, enlargement and replacement of townhouses not more than 4 stories above grade plane that are equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

Exception: Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family dwellings or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section 903.3.1.3 of the *International Building Code.*

2. Add new text as follows:

R301.1.3 Engineered design. When a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the International Building Code is permitted for all buildings and structures, and parts thereof, included in the scope of this code.

R301.1.3.1 Townhouses four stories above grade plane. For structural design of townhouses four stories above grade plane, the structural provisions of the *International Building Code* for Group R-3 shall apply

3. Rename section and add new R313.1 as follows:

R313
FIRE PROTECTION SYSTEMS AND SMOKE ALARMS

R313.1 Fire protection systems. An approved automatic fire sprinkler system shall be installed in new townhouses in accordance with NFPA 13D, except as follows:

1. Where townhouses have separation walls designed based on R317.2, Exception 2, sprinklers shall be provided to protect exterior combustible balconies, decks, porches and ground floor patios located under such combustible projections. Exterior sprinklers and supply piping shall be protected from freezing where freeze protection is required by P2603.6. Where sidewall sprinklers are installed beneath exposed wood joists, sprinklers shall be permitted to be installed with deflectors located 1 inch (25 mm) to 6 inches (152 mm) below the joists, not to exceed a maximum distance of 14 inches (356 mm) below the deck.
2. Where townhouses with private garages have separation walls designed based on R317.2, Exception 2, fire sprinkler protection shall be provided in the garage. Sprinklers in garages shall be connected to a system that complies with NFPA 13D. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered as obstructions with respect to sprinkler placement.

(Renumber subsequent sections)

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4. Revise as follows:

R317.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302 for exterior walls.

Exceptions:

1. A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.
2. A common 1-hour fire-resistance rated wall is permitted for townhouses equipped throughout with an automatic sprinkler system installed in accordance with R313.1. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Where roof surfaces adjacent to the wall are at different elevations, the rated wall shall continue to the upper roof sheathing.

5. Revise as follows:

R317.2.4 Structural independence. Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2-hour~~ fire-resistance-rated wall as provided in Section R317.2.

6. Revise as follows:

R310.1 (Supp) Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency escape and rescue opening. Such opening shall open directly into a public street, public alley, yard or court. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

Exceptions:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m_2).
2. In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

7. Add new text as follows:

AP102 Fire flow. The fire-flow requirements for townhouses specified by IFC Appendix B, where adopted, shall be permitted to be reduced by 75% for buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

Reason: This proposal would add a requirement for residential sprinkler systems to be installed in all new townhouses constructed under the *International Residential Code*, and it includes a package of sprinkler incentives that will help offset the added cost of sprinklers, as well as improve design flexibility. If a reasonable package of incentives can be offered by the code, it simply makes sense for multifamily developers to provide these systems to protect new townhouses.

It is well known that sprinklers are the best tool for providing firesafety in residential occupancies, and the concept of the code providing incentives to encourage the use of these systems in residential occupancies is already in use in the IBC. In fact, the IBC's incentive package provided a basis for major multifamily builders to not oppose the IBC requirement for all residential occupancies to be sprinklered when that issue was considered several years ago.

By accepting this code change, sprinkler protection for townhouses would become reasonably affordable to the builders who build townhouses and to the homeowners who buy them. As a result, we could take a significant step forward in improving life safety and reducing property losses in residential occupancies for decades to come.

The following is an explanation of each new proposed section relating to this sprinkler alternative for dwellings:

1. *Revise Section R101.2:* Typical townhouse construction is no more than 4 stories above grade plane. Presently when a developer goes from 3 to 4 stories above grade, the project is then required to be designed under the IBC. Covering townhouses up to 4 stories above grade plane in the IRC provides a significant incentive for developers. The impact on 4-story buildings would be significant enough to warrant installing sprinklers in 2- and 3-story buildings, which will gain far less benefit from this change, when one considers the overall package. The overall gain of having all townhouses equipped with fire sprinklers makes the allowance of 4-story townhouses under the IRC a worthwhile investment in safety.
2. *Add new Subsection R301.1.3.1 to the "Engineered design" requirement.* This new subsection will address the structural design requirements for townhouses built under the IRC that are 4 stories above grade. The existing structural requirements in the IRC are based on a maximum 3 stories above grade, and by referencing the IBC, proper design is assured.
3. *Rename Section R313 and add new Section R313.1:* This provides a charging requirement for providing residential sprinklers in accordance with NFPA 13D for townhouses. The two exceptions deal with issues not addressed by NFPA 13D, one is outside combustible decks and the other is private garages. The combustible deck sprinkler requirement is consistent with a similar provision to IBC Section 903.3.1.2.1, "Balconies and decks". Most likely a dry sidewall sprinkler supplied by a wet pipe sprinkler system would be used to comply with this exception. The garage sprinkler criteria are based on NFPA 13R Section 6.8.3.3. Dry pendent sprinklers supplied by a wet pipe sprinkler system would most likely be used to protect garages.

4. & 5. *Add new Exception#2 to R 317.2 and revise Exception #5 to R317.2.4:* This is a similar one hour exception that was in BOCA Code Section 310.5 Exception #2 for multiple single-family dwellings. That section of Code read: "In multiple single-family dwellings that are equipped throughout with an approved automatic sprinkler system installed in accordance with Section 906.2.3 (NFPA 13D), the fire-resistance rating between each dwelling unit shall not be less than 1 hour and shall be constructed as a fire partition."

6. *Add new Exception to Section R310.1:* The IRC already allows elimination of escape windows in Groups R-1, R-2, R-4 and I-1 occupancies (IBC Section 1026, Exception 1) based on the installation of fire sprinklers. NFPA Life Safety Code, also contains an NFPA 13D related exception to the escape window requirement for one- and two-family dwellings in Section 24.2.2.1.2(2).
7. *Revise Appendix P101:* The reduction in fire flow is similar to allowances granted by the IFC.

Cost Impact: The code change proposal may increase or decrease the cost of construction, depending on the value of sprinkler incentives versus the cost of adding sprinklers to a particular building.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now. The committee agreed that if the code is going to mandate sprinklers for new construction that is should apply to all structures in the scope of the International Residential Code not just townhouses in a piecemeal approach. The issues of fire flow and not wanting a direct reference to the International Fire Code were also issues in the committee's decision.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

George Martin, Howard County, Department of Licenses & Permits, representing Maryland Building Officials Association (MBOA), requests Approval as Modified by this Public Comment.

Steven L. McDaniel, CPCA, New York State Building Officials Conference, requests Approval as Modified by this Public Comment.

Rick Morris, AvalonBay Communities, Inc., requests Approval as Modified by this Public Comment.

Replace proposal as follows:

1. Add new section as follows:

R313
FIRE SPRINKLER SYSTEM FOR TOWNHOUSES

R313.1 Townhouse Fire Sprinklers. An automatic residential fire sprinkler system shall be installed in townhouses.

Exception: A sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have a fire sprinkler system installed.

R312.2 Design and installation. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with P2904.

(Renumber subsequent sections)

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2. Modify AP101 as follows:

AP101 Fire sprinklers. An approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings ~~and townhouses~~ in accordance with P2904 ~~NFPA 13D~~.

3. Modify exception as follows:

R317.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire--resistance-rated wall assemblies meeting the requirements of Section R302 for exterior walls.

Exception: A common ~~2~~ 1-hour fire-resistance rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations ~~of electrical outlet boxes~~ shall be in accordance with Section R317.3.

4. Modify exception 5 as follows:

R317.2.4 Structural independence. Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2~~ 1-hour fire-resistance-rated wall as provided in Section R317.2.

Commenter's Reason (Martin): In 1989 the State of Maryland enacted House Bill 658, "Sprinkler Systems – Installation in New Construction", that required dormitories, hotels, lodging or rooming houses, multifamily residential dwellings **and townhouses** to be sprinklered. Therefore, since 1990, townhouses in Maryland have been sprinklered and being so has not been detrimental to the homebuilding industry, but has been a major success to saving lives over the past 18 years.

To address reasonable fire protection and affordable housing, many Maryland jurisdictions over the years have permitted townhouse separation of one hour with sprinklers installed in accordance with NFPA 13D. Therefore, based on our past success with sprinklered townhouses with one hour separations between the townhouses, MBOA is in support of mandatory sprinklers in townhouses with one hour dwelling unit separations.

The modifications in Items #1 & #2 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (McDaniel): Our Building Officials Association believes that fair and reasonable sprinkler package should be provided in the IRC to encourage the installation of residential sprinkler systems in townhouse in the IRC. This public comment provides a good beginning with a sprinkler alternative that we believe meet these criteria.

To address reasonable fire protection and affordable housing, many other jurisdictions throughout the country over the years have permitted townhouse separation of one hour with sprinklers installed in accordance with NFPA 13D. Therefore, based on these past successes with sprinklered townhouses with one hour separations between the townhouses, our building officials association is in support of mandatory sprinklers in townhouses with one hour dwelling unit separations.

The modifications in Items #1 & #2 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (Morris) AvalonBay originally submitted RB66-07/08 because we believe that a fair and reasonable sprinkler package should be provided in the IRC to encourage the installation of residential sprinkler systems in townhouses in the IRC. Contrary to the Committee's published reason for disapproval of RB66, there are numerous state and local building code amendments to the IRC throughout the U.S. where townhouses are require to be sprinklered, whereas detached single family homes are not, because it is considered the "first step" in eventually getting all residential uses sprinklered. In fact, even though the committee also disapproved RB65 for the same reason as this code proposal (RB66), there was an assembly vote on RB65 and it passed, over the disapproval of the committee. Therefore, clearly the ICC membership does see merit in the rationale for mandatory sprinkling of townhouses.

This public comment simplifies the original RB66. It provides a good beginning for a townhouse sprinkler requirement that AvalonBay believes would meet code officials' and townhouse builders/developers' criteria as fair, reasonable and economical.

To address reasonable fire protection and affordable housing, many other jurisdictions throughout the country over the years have permitted townhouse separation of one hour with sprinklers installed in accordance with NFPA 13D. Therefore, based on these past successes with sprinklered townhouses with one hour separations between the townhouses, AvalonBay is in support of mandatory sprinklers in townhouses with one hour dwelling unit separations.

The modifications in Items #1 and #2 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Final Action: AS AM AMPC____ D

RB67-07/08

R302.1, Table R302.1, Table R302.1(2) (New), R317.2, R317.2.4, R317.2.5 (New), R309.7 (New), R313.2, R310.1, AP102 (New)

Proposed Change as Submitted:

Proponent: Tom Lariviere, Fire Department, Madison, MS, representing Fire & Life Safety Section of the International Association of Fire Chiefs (IAFC)

1. Revise as follows:

R302.1 (Supp) Exterior walls. Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1(1); or for dwellings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D and Table R302.1(2).

Exceptions:

1. Walls, projections, openings, or penetrations in walls perpendicular to the line used to determine the fire separation distance.
2. Walls of dwellings and accessory structures located on the same lot.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
4. Detached garages accessory to a dwelling located within 2 feet (610 mm) of a lot line are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(1) (Supp)
EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour with exposure from both sides	0 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet
	(Not fire-resistance rated)	0	5 feet
Openings	Not allowed	N/A	< 3 feet
	25 % Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	< 5 feet
		None required	5 feet

N/A = Not Applicable

TABLE R302.1(2)
EXTERIOR WALLS – DWELLINGS WITH FIRE SPRINKLERS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour with exposure to the fire from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet[1]
Projections	Fire-resistance rated	1 hour on the underside	2 feet[1]
	(Not fire-resistance rated)	0	3 feet
Openings	Not allowed	N/A	< 3 feet
	Unlimited	0	3 feet[1]
Penetrations	All	Comply with Section R317.3	< 3 feet
		None required	3 feet[1]

1. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with NFPA 13D, as amended by R309.7, the fire separation distance for non-rated exterior walls and rated projections shall be permitted to be reduced to zero feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

2. Revise as follows:

R317.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302 for exterior walls.

Exceptions:

1. A common 2-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with Section R317.3.
2. A common 1-hour fire-resistance rated wall is permitted for townhouses equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D, as amended by R309.7 and R317.2.5, up to an aggregate floor area of 28,000 square feet per building. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Where roof surfaces adjacent to the wall are at different elevations, the rated wall shall continue to the upper roof sheathing.

R317.2.4 Structural independence. Each individual townhouse shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit may fasten to the common wall framing.
3. Nonstructural wall coverings.
4. Flashing at termination of roof covering over common wall.
5. Townhouses separated by a common ~~2-hour~~ fire-resistance-rated wall as provided in Section R317.2.

3. Add new text as follows:

R317.2.5 Fire sprinklers for balconies, decks, porches and ground floor patios. Where townhouses have separation walls designed based on R317.2, Exception 2, sprinklers shall be provided to protect exterior combustible balconies, decks, porches and ground floor patios located under such combustible projections. Exterior sprinklers and supply piping shall be protected from freezing where freeze protection is required by P2603.6. Where sidewall sprinklers are installed beneath exposed wood joists, sprinklers shall be permitted to be installed with deflectors located 1 inch (25 mm) to 6 inches (152 mm) below the joists, not to exceed a maximum distance of 14 inches (356 mm) below the deck.

4. Add new text as follows:

R309.7 Fire Sprinklers. Private garages shall be protected by fire sprinklers, where:

1. The garage is in a townhouse having separation walls designed based on R317.2, Exception 2.
2. A garage wall has been designed based on Table R302.1(b), Footnote 1.

Sprinklers in garages shall be connected to a system that complies with NFPA 13D. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered obstructions with respect to sprinkler placement.

5. Revise as follows:

R313.2 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

   Exception: In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

3. In a common area on each additional story of the dwelling, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

When more than one smoke alarm is required to be installed within an individual dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

6. Revise as follows:

R310.1 (Supp) Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency escape and rescue opening. Such opening shall open directly into a public street, public alley, yard or court. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

Exceptions:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m2).
2. In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

7. Add new text as follows:

AP102 Fire flow. As provided in IFC Appendix B, where adopted, the fire-flow requirements for one and two family dwellings and townhouses shall be permitted to be reduced by 50% for buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D.

Reason: Fire sprinklers are universally recognized as the most effective means of reducing America's fire losses and preventing firefighter deaths and injuries associated with firefighting operations. Both of these objectives are fundamental to the mission of the International Association of Fire Chiefs (IAFC). Through this proposal, the IAFC hopes to encourage more widespread use of residential sprinklers by establishing a package of sprinkler incentives in the IRC that will appeal to homebuilders and consumers.

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The use of incentives to encourage the installation of fire sprinkler systems is traceable in model building codes for at least 80 years, and today, these incentives are woven into the text of nearly every ICC code. Likewise, in communities throughout the United States where residential sprinklers are required, incentives play a critical roll in developing and maintaining community support for sprinklers. Nevertheless, sprinkler incentives remain few and far between in the IRC, offering little to offset the cost of installing sprinklers or to enhance their value through building design options. Many stakeholders in the residential construction industry have made it clear that this must change before we'll see residential sprinklers in the mainstream of new home construction, and as an organization dedicated to public safety, IAFC chose to undertake the challenge of assembling a reasonable IRC incentive package to motivate the use of sprinklers. To identify incentives that would be seen by the homebuilding industry as having value, input was sought and received from the National Association of Homebuilders, and although NAHB was unable to consider endorsing this proposal prior to the code change submittal deadline, their input is reflected in the proposed text.

Overall, IAFC believes that the package of incentives contained in this proposal will significantly enhance the safety of buildings constructed in accordance with the IRC, and ultimately, we expect to see more homes protected by fire sprinklers once these revisions are published in the IRC. Although individual items in this package may be viewed by some as too liberal, while others will say that they are not liberal enough, IAFC believes that each of the suggested changes is reasonable and justifiable for a sprinklered dwelling.

The following discussion provides justifications for each of the 7 parts of this proposal.

1. ***Modify existing Section R302.1 and add a new Table R302.1(b)***: This change provides a significant financial and design incentive for residential sprinklers. From a financial perspective, the proposal permits cost reductions related to exterior wall construction and, in the case of a planned community, could result in more developable lots. From a design advantage perspective, the proposal permits homes to have larger footprints without triggering fire-rated exterior walls and permits more flexible use of windows on walls facing property lines.

   From a firesafety perspective, the proposed requirements generally put the code back where it was in 2000 and 2003, so there is essentially no concession compared to how homes have been built under the IRC since the code was first published in 2000. In 2006, the IRC's fire separation distances for non-rated exterior walls were increased from 3 feet to 5 feet for the purpose of coordinating the IRC's residential separation distances with those in the IBC (Code Change G128-03/04). History shows that residential sprinklers reliably limit fire spread to the room of origin, and with such protection, allowing the code to revert to a 3-foot separation distance provides a reasonable compensation for sprinklers. Certainly, the probability of a favorable outcome in the event of a fire is much better for a sprinklered building with a 3-foot separation versus a nonsprinklered building with a 5-foot separation, so encouraging sprinklers is a preferred approach.
2. ***Revise the exceptions to R317.2 and R317.2.4***: Because residential sprinklers will slow fire growth and often completely extinguish a fire, the fire challenge to townhouse separation walls is expected to be significantly delayed, reduced or eliminated. Precedent for this incentive exists in Section 310.5 Exception 2 of the BOCA code, which read: "In multiple single-family dwellings that are equipped throughout with an approved automatic sprinkler system installed in accordance with Section 906.2.3 (NFPA 13D), the fire resistance rating between each dwelling unit shall not be less than 1 hour and shall be constructed as a fire partition." Clearly, the overall level of safety and best chance for a favorable outcome in the event of a fire is through the use of fire sprinklers with a 1-hour wall versus no sprinklers and a 2-hour wall.
3. ***Add a new Section R317.2.5***: This revision provides a limitation on the incentive described in Part 2 above. Because NFPA 13D systems are being recognized to a limited degree for property protection, as well as life safety, it was considered appropriate to ask for sprinklers to protect combustible exterior projections sometimes associated with outdoor fires, typically associated with a barbecue grill on a deck. Similar requirements are established by the IBC in Section 903.3.1.2.1 for NFPA 13R systems. Often, this type of protection is provided by dry sidewall sprinklers connected to a wet pipe sprinkler system.
4. ***Add a new Section R309.7***: This revision provides a limitation on the incentive described in Part 2 above. Because NFPA 13D systems are being recognized to a limited degree for property protection, as well as life safety, it was considered appropriate to ask for sprinklers to protect sprinklers to protect garages. Design criteria suggested for sprinklers was derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, this type of protection is provided by dry pendent sprinklers connected to a wet pipe sprinkler system.
5. ***Revise Section R313.2***: The value of smoke alarms with respect to life safety is well recognized. Nevertheless, code requirements associated with how many smoke alarms must be installed in a dwelling and where they must be located were developed without respect to the presence of fire sprinklers. It is widely known that the addition of fire sprinklers to a dwelling will provide a significant improvement to life safety and property protection versus having smoke alarms alone, so eliminating a minimal number of smoke alarms as part of a package to gain sprinklers is a reasonable approach.

   Contrary to what one might expect as a result of reducing the number of smoke alarms, the proposed revision could actually improve the performance of smoke alarms because it will require that a minimum of one smoke alarm be located in the common area on each floor. Currently, the code only requires smoke alarms outside of sleeping areas, often satisfied by installing a smoke alarm in the hallway outside of bedroom doors. The number of alarms will only be reduced in cases where there is more than one sleeping area on a floor.

   Given that fires often start in kitchens and living rooms, installing a smoke alarm in a more central area, as required by this proposal, may well result in more effective detection of fires in these areas. Plus, with the code still requiring smoke alarms in each bedroom, connected to common area smoke alarms, waking effectiveness and protection of bedroom areas will not be impacted by this proposal.
6. ***Add a new Exception to Section R310.1***: This part of the proposal will, on its own, provide enough incentive to get a home sprinklered in some cases. Homebuilders and homeowners often want greater flexibility to use a variety of window types and configurations to provide required light and ventilation (it should be noted an exception to the emergency escape window requirement is unlikely to result in rooms without windows or doors because rooms will still require light and ventilation to comply with R303.1 and it seems unlikely that homeowners would choose to forgo natural light in bedrooms). For example, by allowing side-hinged windows, smaller windows or strategically positioned windows that wouldn't meet the current escape window requirements, there are potential gains in energy efficiency and wind resistance versus traditional hung windows with friction seals used to meet escape provisions.

   To those who might regard egress windows as a safety feature that should not be equated to sprinkler protection, consider that the IRC already allows elimination of escape windows in Groups R-1, R-2, R-4 and I-1 occupancies (IBC Section 1026, Exception 1) based on the installation of fire sprinklers. It simply makes no sense that sprinkler protection should be considered as providing adequate safety without escape windows in fraternities, apartments, hotels, adult care, child care and assisted living facilities, among others, but not in one- and two-family dwellings. In fact, even the NFPA Life Safety Code, a document with a pure life safety focus, provides an exception to the escape window requirement for one- and two-family dwellings [2006 NFPA 101, Section 24.2.2.1.2(2)] based on the installation of fire sprinklers in accordance with NFPA 13D. Recognizing the high level of safety that will be provided in homes that have both smoke alarms and sprinklers, providing adequate time for occupants to escape a fire using the normal means of egress, and with so much code precedent and a high incentive value, it makes sense to extend the sprinkler allowance for escape windows to include one- and two-family dwellings and townhouses.
7. ***Add a new Section AP102***: The reduction in fire flow simply calls attention to an allowance already permitted by the IFC.

Cost Impact: The code change proposal will decrease the cost of construction.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: **Disapproved**

Committee Reason: The committee felt that without mandatory language requiring sprinkler systems in the body of the code the trade off's offered by this code change don't belong. Further, the issues of outside wall protection and attic protection were a concern with this proposal. There was additional concern about trading off needed passive protection. Overall, he committee felt that there was insufficient effective or substantial reason to move the sprinkler requirements out of Appendix P where it is now. Keeping this in the appendix makes it available to jurisdictions that wish to take advantage of it and just because it is in the Appendix doesn't mean the provisions are hidden.

Assembly Action: **None**

Individual Consideration Agenda

This item is on the agenda for individual consideration because public comments were submitted.

Public Comment 1:

Robert F. Loeper, Jr., President, representing Region VII Chapter of ICC, requests Approval as Modified by this Public Comment.

George Martin, Howard County, Department of Licenses and Permits, representing Maryland Building Officials Association (MBOA), requests Approval as Modified by this Public Comment.

Steven L. McDaniel, CPCA, New York State Building Officials Conference, requests Approval as Modified by this Public Comment.

Rick Morris, AvalonBay Communities, Inc., requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1(1); or for dwellings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, Table R302.1(2). These provisions shall not apply to walls, projections, openings or penetrations in walls that are perpendicular to the line used to determine the fire separation distance. Projections beyond the exterior wall shall not extend more than 12 inches (305 mm) into the areas where openings are prohibited.

Exceptions:

1. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
2. Detached garages accessory to a dwelling located within 2 feet (610 mm) of a lot line are permitted to have roof eave projections not exceeding 4 inches (102 mm).
3. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(1)
EXTERIOR WALLS

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	(Fire-resistance rated)	1 hour with exposure from both sides	0 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 feet
	(Not fire-resistance rated)	0	5 feet
Openings	Not allowed	N/A	< 3 feet
	25 % Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	< 5 feet
		None required	5 feet

N/A = Not Applicable

TABLE R302.1(2)
EXTERIOR WALLS – DWELLINGS WITH FIRE SPRINKLERS

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	(Fire-resistance rated)	1 hour with exposure to the fire from the outside	0 feet
	(Not fire-resistance rated)	0 hours	3 feet[1]
Projections	Fire-resistance rated	1 hour on the underside	2 feet[1]
	(Not fire-resistance rated)	0	3 feet
Openings	Not allowed	N/A	< 3 feet
	Unlimited	0	3 feet[1]
Penetrations	All	Comply with Section R317.3	< 3 feet
		None required	3 feet[1]

1. For residential subdivisions where all dwellings are equipped throughout with an automatic sprinkler systems installed in accordance with Section P2904, the fire separation distance for non-rated exterior walls and rated projections shall be permitted to be reduced to zero feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

R310.1 Emergency escape and rescue required. Basements and every sleeping room shall have at least one operable emergency and rescue opening. Such opening shall open directly into a public street, public alley yard or court. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room, but shall not be required in adjoining areas of the basement. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) above the floor. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way.

Exceptions:

1. Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m2).
2. In dwelling units equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

Commenter's Reason (Bartell/Loeper): ICC Region 7 unanimously believes that fair and reasonable sprinkler alternatives should be provided in the IRC to encourage the installation of residential sprinkler systems. This public comment provides a good beginning with these two (2) sprinkler alternatives that we believe meet these criteria.

To address reasonable fire protection and affordable housing, there have been many jurisdictions over the years that have permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under the NFPA 101, "life Safety Code") in accordance with NFPA 101 Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two-family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, in those jurisdictions that have permitted the use of this exception the great majority of bedroom designs have included the use of windows that meet the emergency window criteria and this exception has typically been used to accommodate specific design features or unusual circumstance. This truly does afford additional flexibility to the homebuilder or homeowner to utilize other types of windows and design features without the encumbrance of the minimum opening and height above the floor requirements, and, without any detriment to the safety of the occupants of these sprinklered dwellings.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

Additionally, the modifications in this public comment referencing Section P2904 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (Martin): In 1989 the State of Maryland enacted House Bill 658, "Sprinkler Systems – Installation in New Construction", that required dormitories, hotels, lodging or rooming houses, multifamily residential dwelling **and townhouses** to be sprinklered. Therefore, since 1990, townhouses in Maryland have been sprinklered and being so has not been detrimental to the homebuilding industry, but has been a major success to saving lives over the past 18 years.

In addition to the sprinkling of the above-noted residential occupancies by the State of Maryland, as of this year 79 out of 157 Maryland jurisdictions have mandatory sprinkling of one-and two family dwellings.

To address reasonable fire protection and affordable housing, many Maryland jurisdictions over the years have permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under the NFPA 101, "life Safety Code") in accordance with NFPA 101 Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, just because jurisdictions permit this exception does not mean in the great majority of bedroom designs that no window is provided. It only provides additional flexibility to the homebuilder or homeowner to provide other types of windows that they desire without the encumbrance of the minimum opening and height above the floor requirement.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

Therefore, based on our past success with sprinkling one-and two dwellings in over half the jurisdictions in Maryland over the past 18 years, MBOA is in support of this public proposal to provide further incentives to encourage sprinkling of dwellings in the IRC.

The modifications in this public comment to reference Section P2904 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (McDaniel): Our Building Officials Association believes that fair and reasonable sprinkler alternatives should be provided in the IRC to encourage the installation of residential sprinkler systems in the IRC. This public comment provides a good beginning with two (2) sprinkler alternatives that we believe meet these criteria.

To address reasonable fire protection and affordable housing, there has been many jurisdictions over the years that have permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under the NFPA 101, "life Safety Code") in accordance with NFPA 101 Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, just because jurisdictions permit this exception does not mean in the great majority of bedroom designs that no window is provided. It only provides additional flexibility to the homebuilder or homeowner to provide other types of windows meeting the light and ventilation requirements under the IRC Code Section R303 without the encumbrance of the minimum opening and height requirement above the floor of Section R310.2.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

In addition, the modifications in this public comment to reference Section P2904 will coordinate the IRC Committee approved Code Proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Commenter's Reason (Morris): After reading the Committee's published reason for disapproval and then watching the video of the actual public testimony on RB67-07/08 at http://www.ircfiresprinkler.org/resources.htm, I find the Committee's reason for turning down this reasonable sprinkler alternative package that was submitted by the International Association of Fire Chiefs, illogical and without reasonable merit. Based on the IAFC's written supporting statement and the public testimony give in support of this code proposal vs. the opposing testimony, there was more than adequate justification to approve this code proposal. This code proposal (RB67) does NOT mandate sprinklers, but only provided fair and reasonable "trade-offs" when sprinklers are installed.

AvalonBay believes that fair and reasonable sprinkler alternatives should be provided in the IRC to encourage the installation of residential sprinkler systems in the IRC. This public comment provides a good beginning with two (2) sprinkler alternatives that we believe meet this minimum criteria.

To address reasonable fire protection and affordable housing, there have been many jurisdictions over the years that her permitted the elimination of the bedroom emergency window (which is called the "secondary means of escape" under NFPA 101, "Life Safety Code") in accordance with NFPA 101, Section 24.2.2.1.2 without any detriment to the safety of the occupants in these sprinklered dwellings. This window exception for sprinklers in one and two family dwellings has been in the Life Safety Code since the 1981 edition (over 9 editions and 27 years). In fact, just because jurisdictions permit this exception does not mean in the great majority of bedroom designs that no window is provided. It only provides additional flexibility to the homebuilder or homeowner to provide other types of windows that they desire without the encumbrance of the minimum opening and height above the floor requirement.

In addition, the exterior wall provisions for sprinklered dwellings, is also a reasonable fire protection compensatory feature to provide and also addresses the affordable housing issue.

In addition, the modifications in this public comment to reference Section P2904 will coordinate the IRC Committee approved code proposal RP3-07/08 (the prescriptive sprinkler design criteria that is now being placed in the body of the IRC) with this code change.

Public Comment 2:

Crystal Feiser, representing West Virginia Code Officials Association, requests Disapproval.

Commenter's Reason: The Committee's action to disapprove this and all proposals to mandate sprinklers in the body of the IRC is correct and should not be overturned. The decision to require sprinklers should be left up to state and local jurisdictions. Appendix P can be adopted, if so desired. West Virginia will be forced to amend or delete the fire sprinkler requirements for the following reasons: water line size, pressure and lack of water availability.

Final Action: AS AM AMPC____ D W

RB68-07/08

R313.1 (New), Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Sean DeCrane, Fire Department, Cleveland, OH, representing International Association of Fire Fighters, Local 93

1. Add new text as follows:

R313.1 Fire protection systems. One and two family dwellings that incorporate lightweight truss or engineered lightweight material such as wooden I-beams, cold form steel or trusses in the floor or ceiling areas shall have the floors/ceilings assemblies protected by a thirty (30) minute fire-rated barrier.

Exception: Where the building is protected with a sprinkler system designed to NFPA 13D.

(Renumber subsequent sections)

2. Add standard to Chapter 43 as follows:

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NFPA

13D-07 Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

Reason: On August 13, 2006 a Wisconsin fire fighter was killed, and a second fire fighter injured, when the floor they were operating on collapsed sending them into the basement. One fire fighter fell directly into the room of origin and was killed, the second fire fighter landed on the opposite side of a block wall and survived by shielding herself and making an escape through a rear window. They checked the floor to ensure it was safe and solid, just prior to collapse they heard a loud crack. T

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26. One of the recommendations is to "modify current building codes to require that lightweight trusses be protected with a fire barrier". This should not only pertain to truss construction. There are additional forms of construction that can be determined to be lightweight, cold form steel, bar joists, wooden engineered I-beam, etc., the recent trend in residential construction is to use products that are financially beneficial. It is the belief of many of us in the fire service that as the industry engineers products to a more finite point we are losing our safety factors.

In April, 2005, NIOSH released their report "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures". In their release they recommended the placement of a labeling system on buildings to indicate the type of construction. While this recommendation will probably not be acceptable to residents of a one or two family home, we can mandate that they increase the protection of the construction type to provide increased safety to the residents and the responding fire fighters.

1. National Institute for Occupational Safety and Health Report F206-26. July, 2007.
2. National Institute for Occupational Safety and Health Alert, "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures".

Cost Impact: This code change proposal will increase the cost of construction.

Analysis: Review of proposed new standard NFPA 13D-07 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria.

Committee Action: Disapproved

Committee Reason: The committee indicated that the proposed language lacked the proper technical definition of lightweight materials. Further, the committee raised some issues with crawl spaces as they applied to the proposed text as it addressed floor or ceiling areas. There was insufficient technical justification specifically no time differences provided as they apply to lightweight trusses and lightweight material including wooden I-beams and cold formed steel or trusses to support this proposal.

Assembly Action: None

Individual Consideration Agenda

This item is on the agenda for individual consideration because a public comment was submitted.

Public Comment:

Sean DeCrane, Fire Department, Cleveland, OH, representing International Association of Fire Fighters, requests Approval as Modified by this Public Comment.

Replace proposal as follows:

R313.1 Fire protection systems: One Family and Two Family Occupancies incorporating designed lightweight materials such as trusses or engineered lightweight material (including but not limited to wooden I-Beams, cold-form steel or light gauge bar joist trusses) in the structural floor or ceiling areas, shall protect the floors/ceilings areas with a barrier exhibiting a thirty (30) minute fire resistance on the underside of the floor/ceiling system.

Exception: If the underside of a floor system is a crawl space where no combustible materials are stored.

(Renumber subsequent sections)

Commenter's Reason: On August 13, 2006 a Wisconsin fire fighter was killed, and a second fire fighter injured, when the floor they were operating on collapsed sending them into the basement. One fire fighter fell directly into the room of origin and was killed, the second fire fighter landed on the opposite side of a block wall and survived by shielding herself and making an escape through a rear window. They checked the floor to ensure it was safe and solid, just prior to collapse they heard a loud crack. T

The floor they were operating on was unprotected lightweight construction that collapsed without warning. In the ensuing investigation, the National Institute for Occupational Safety and Health released report F2006-26. One of the recommendations is to "modify current building codes to require that lightweight trusses be protected with a fire barrier". This should not only pertain to truss construction. There are additional forms of construction that can be determined to be lightweight, cold form steel, bar joists, wooden engineered I-beam, etc., the recent trend in residential construction is to use products that are financially beneficial. It is the belief of many of us in the fire service that as the industry engineers products to a more finite point we are losing our safety factors.

In their report 2007-12 released May 16, 2008, NIOSH recommended "Ensure fire fighters are trained for extreme conditions such as high winds and rapid fire progression associated with lightweight construction". They further stated, "In this era of new lightweight construction, training procedures covering strategy and tactics in extreme operations conditions, such as high winds and lightweight building construction (i.e. materials and design) are needed for all levels of fire fighters. Lightweight constructed buildings fail rapidly with little warning, complicating rescue efforts. The potential for fire fighters to become trapped or involved in a collapse may be increased. There are twenty-nine actions for fire fighters can take to protect themselves when confronted with buildings utilizing lightweight building components as structural members. They range from looking for signs or indicators that these materials are used in buildings (such as, newer structures, large unsupported spans, and heavy black smoke being generated) to getting involved in newer building code development".

On September 27, 2007 NIOSH released report 2006-24. The first recommendation of the report read "Ensure that fire fighters and incident commanders are aware unprotected pre-engineered I-joist floor systems may fail at a faster rate than solid wood joists when exposed to direct fire impingement, and they should plan interior operations accordingly". The discussion of the recommendation is quite lengthy but identifies the

advantages of the construction industry using this type of construction but also relates the dangers to fire fighters, "The Illinois Fire Service Institute, at the University of Illinois, conducted tests to help determine the structural stability of sample floor systems. These studies suggest that engineered wooden I-beams can fail in as little as 4 minutes and 40 seconds under controlled test conditions". The report also states that weakened floors are difficult to detect from above as the floor surface may appear intact.

On November 16, 2007, NIOSH released report F2007-07. In this Fire Fighter Death in the Line-of-Duty report, NIOSH recommends "building code officials and local authorities having jurisdiction should consider modifying the current codes to require that lightweight trusses are protected with a fire barrier on both the top and the bottom". The report further states "In this incident, the floor trusses for the first floor did not have any protection on the bottom cord, which immediately exposed the trusses to fire in the basement. Unfinished basements are very common throughout the country. Basements typically house additional fire exposures such as alternative heating sources, hot water heaters, clothes dryers, etc.. It is critical for trusses and lightweight engineered wood I-beams that are used in a load-bearing assembly to be protected with a thermal barrier such as gypsum wallboard. The function of the thermal barrier is a critical factor in the fire performance of the assembly".

In April, 2005, NIOSH released their report "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures". In their release they recommended the placement of a labeling system on buildings to indicate the type of construction. While this recommendation will probably not be acceptable to residents of a one or two family home, we can mandate that they increase the protection of the construction type to provide increased safety to the residents and the responding fire fighters.

1. National Institute for Occupational Safety and Health Report F206-26. July, 2007.
2. National Institute for Occupational Safety and Health Report F2007-12, May, 2008.
3. National Institute for Occupational Safety and Health Report F206-24, September, 2007.
4. National Institute for Occupational Safety and Health Report F2007-07, November, 2007.
5. National Institute for Occupational Safety and Health Alert, "Preventing Injuries and Deaths of Fire Fighters due to Truss System Failures".

Final Action: AS AM AMPC____ D

RB71-07/08

R313, R313.1.1 (New), R313.1.2 (New), R313.1.3 (New), Chapter 43 (New)

Proposed Change as Submitted:

Proponent: Roger R. Evans, Park City Municipal Corporation, representing Utah Chapter of ICC

1. Revise section title as follows:

SECTION R313
~~SMOKE~~ ALARMS

2. Add new text as follows:

R313.1.1 Carbon monoxide alarms. In new construction, dwelling units within which fuel-fired appliances are installed shall be provided with an approved carbon monoxide alarm installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s).

R313.1.2 Where required-existing dwellings. In existing dwellings, where interior alterations, repairs, fuel-fired appliance replacements of additions requiring a permit occur, or where one or more sleeping rooms are added or created, carbon monoxide alarms shall be provided in accordance with Section 313.1.1.

R313.1.3 Alarm requirements. The required carbon monoxide alarms shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. Carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

(Renumber subsequent sections)

3. Add standard to Chapter 43 as follows:

UL

2034-96 Standard for Single and Multiple Station Carbon Monoxide Alarms

Reason: According to the Journal of the American Medical Association (JAMA), carbon monoxide is the leading cause of accidental poisoning deaths in America. Over 1,500 people die annually due to accidental carbon monoxide exposure and an additional 10,000 seek medical attention. www.homesafe.com

Cost Impact: The code change proposal will increase the cost of construction from between $50.00 to $300.00 per dwelling unit.

Analysis: Review of proposed new standard UL 2034-96 indicated that, in the opinion of ICC Staff, the standard did comply with ICC standards criteria, Section 3.6.3.1.

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Hodge, Vernon (DHCD)

From: Wallace, Clinton (DHCD)
Sent: Wednesday, May 20, 2009 9:31 AM
To: Hodge, Vernon (DHCD)
Subject: FW: Fire Sprinkler Protection

FYI

Clinton Wallace
State Building Codes Administrator
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From: Matchneer, William W [mailto:william.w.matchneer@hud.gov]
Sent: Friday, May 15, 2009 4:15 PM
To: 'MHARRDG@aol.com'; 'Mark Weiss (MMARKWEISS@AOL.COM)'; 'prdaniels@fuquamgmt.com'; 'charles44@ameritech.net'; 'jack.henry@chiefind.com'; 'lkeener@palmharbor.com'; 'rickmurdock@guerdon.com'; 'ronnie@hstr.com'; 'nashua@nashuahomesofidaho.com'; 'scott@heritagehomesandrealty.com'; 'buck@hstr.com'; 'pat@shamrock-homes.com'; 'readm@fourseasonshousing.com'; 'wbell@palmharbor.com'; 'kengeljack@hi-techhousing.com'; 'jweldy@verizon.net'; 'mobile00@frontiernet.net'; 'chartley@taylorhomes.net'; 'Weldonwatson@aol.com'; 'psurles@athensparkhomes.com'; 'DShaffer@patriothomes.com'; 'kenny@rochesterhomesinc.com'; 'jcummings@platinumhomes-llc.com'; 'rlyons@pennlyon.com'; 'jmcgee@modularone.net'; 'bob.phillips@chiefind.com'; 'Tissie114@aol.com'; 'walt2701@earthlink.net'; 'cboyer@hstr.com'; 'Gary.Pritchard@clayton.net'; 'BELLMHKS@DOOR.NET'; 'THOMASHAGAR@MMHA.NET'; 'DJH@SOLITAIREHOMES.COM'; 'Kfoskey@liveoakhomes07.com'; 'GSULLIVAN@liveoakhomes07.com'; 'pknight@championhomes.net'; 'dbatchelor@sehomes.com'; 'kbrown@sehomes.com'; 'dpajakowski@skylinecorp.com'; 'GGINDY500@aol.com'; 'Kathy.Munson@fleetwood.com'; 'charley.lott@fleetwood.com'; 'kip.thrush@fleetwood.com'; 'tomjr@hornerandassociates.com'; 'mark@homesteadhousinginc.com'; 'bbv2008@earthlink.net'; 'foggies2@yahoo.com'; 'Andersonarizona@aol.com'; 'Hworks4u2@aol.com'; 'laddawson@guerdon.com'; 'tdecio@skylinecorp.com'; 'wgriffiths@championhomes.net'; 'leo@forahouse.com'; 'chris@magnoliahomes.biz'; 'JGledhill@championhomes.net'; 'dgraham@tombigbee.com'; 'len.mcgill@fleetwood.com'; 'tom@modular.org'; 'rsvinas@pbsnc.com'; 'ned@fuquahomes-mo.com'; 'albert.g.endres@state.or.us'; 'Benito Martinez'; 'bjohnson@radcoinc.com'; 'chris.stephens@mail.oci.state.ga.us'; Chuck Smith (smith.chuck@hsmv.state.fl.us); 'darlene.warren@state.tn.us'; Dick Reinhard (dreinhard@pfscorporation.com); 'hajo235@lni.wa.gov'; 'James Bergan'; 'JRothman@pfscorporation.com'; Mark Luttich (mark.luttich@nebraska.gov); Mike Zieman (MikeZieman@aol.com); 'mpalmer@trarnold.com'; 'nancy.gephart@dfbls.az.gov'; 'rmarchman@radcoinc.com'; 'rnolan@hwceng.com'; 'rtanger@trarnold.com'; Steve Bernia (steve.bernia@state.co.us); 'steve.hibner@state.tn.us'; 'tompos@ntainc.com'; 'trodgers@dbs.idaho.gov'; 'Alfred Cocce'; 'Brian Ferris'; 'Cal Steiner'; 'Charles Cook'; Cindy Bocz (cbocz@tdhca.state.tx.us); 'Dan Chapman'; 'Dan Jones'; 'debra.blake@dfbls.az.gov'; 'Don LeBrun'; 'Dwight Davis'; 'Ed Landon'; 'Gary Childer'; Gene Humphrey (genehumphrey@mid.state.ms.us); 'Hazel Stephenson'; 'Irvin Poke'; Jimmy Sloan (Jimmy.Sloan@amhc.alabama.gov); 'Joe Garcia'; 'John Leyden'; 'John McMillan'; 'John Reilly'; 'Justin DeWitt'; 'Kevin Cimini'; 'Kevin deGroat'; Dyer, Lorenzo (DHCD); 'Lynne King'; Mark Conte (mconte@state.pa.us); 'Mark Long'; 'Mike Anderson'; 'Mike Montoya'; Mitch Woodrum (mitch.e.woodrum@wv.gov); 'Paul Govig'; 'Paul Merriman'; 'Peter Desch'; 'Peter Schmidt'; Randy Vogt (randy.vogt@state.mn.us); 'Rich Bolten'; Richard Weinert (rweinert@hcd.ca.gov); 'Richelle Wakefield'; 'Ricky Davis'; Robert Leclair (robert.v.leclair@maine.gov); 'Ron Pleus'; Sammy Hoover (sammy.hoover@dps.ia.gov); 'Scott McLellan'; Tim King (tking@dos.state.ny.us); 'Tina Lechowicz'; 'Tom Rodgers'; Wallace, Clinton (DHCD); Warren Ducharme; Whit Waller (whit.waller@arkansas.gov); Brian Cooney (BRIAN@mfghome.org); Gail Cardwell (gcardwell@mfghome.org); Jeff Inks (JEFF@mfghome.org); Thayer Long (TLong@mfghome.org); Tom Beers (tbeers@mfghome.org); Kevin Jewell (mhcc@kgjewell.com); Tim Sheahan (tpsheahan@cox.net); Bill Farish (bill.farish@fleetwood.com); Bill Lagano (wjlagano@aol.com); Bill Stamer; Danny Ghorbani (MHARRDG@AOL.COM); Doug Gorman (doug@homemart.us); Frank Walter (fandrwalter@verizon.net); Jack Berger (jdberger@comcast.net); Karl Braun (mhcckarlsr@cs.com); Martin Denesse (graceharbourchurch@yahoo.com); Michael Wade (mwade@cavhomesinc.com); Mike Lubliner (lublinerm@energy.wsu.edu); Susan Brenton (suebrenton@aol.com); Terry Nelson (mhoai1@aol.com); Theresa DesFosses (theresa@statemanufacturedhomes.com)
Cc: Aguolu, Geraldine O; Brolin, John; Carpio, Daniel; Cocke, Elizabeth A; Garrison-Richardson, Veronica; McDuffie, Patricia A; Mckee, Shawn P; Mendlen, Rick A; Pethel, Hubert L; Wallace, Angelo M; Ashok Goswami (agoswami@ibts.org); Darioush Danaei; Dick St. Onge (RSt.Onge@ibts.org); Howard Weissman (HWeissman@ibts.org); Jason McJury (jmcjury@ibts.org); Paul Hancher (phancher@IBTS.org); Christman, Courtney E; Cornejo, Eleonora X; Goldstein, Steven M; Iveycolson, Kirsten A; Jones, Yvonne D; Kritikos, Efrosine; Podzius, Kasey M; Postiglione, Amanda J; Race, Peter S; Shumway, John B; Varrieur, Brian M
Subject: FW: Fire Sprinkler Protection

Folks:

Here is an update on fire sprinkler laws. Whether or not you agree with the tone of the text, this trend is simply the current reality. Don't expect a preemption argument that HUD properly discarded twenty years ago to stop this tide, either at HUD or in the courts. The only reasonable approach now is for the industry to get behind a sprinkler rule that would at least preempt state and local governments from dictating the design, installation and testing of sprinkler systems when they are required. The more time we waste, the more adverse impact the industry will suffer.

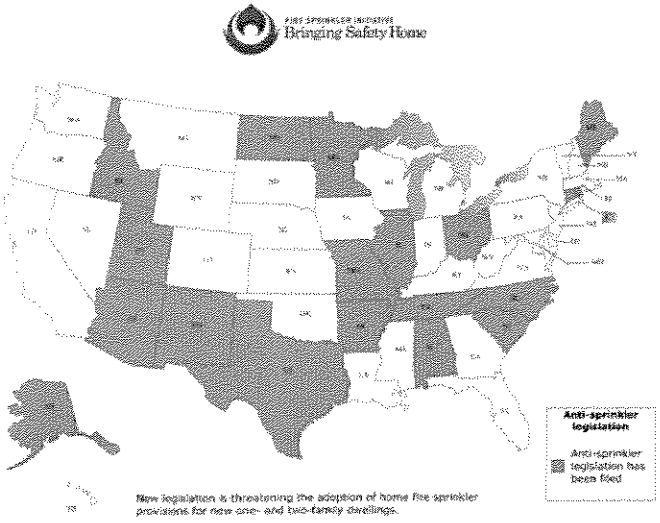
Legislative Alert

New legislation is threatening the adoption of home fire sprinkler provisions for new one- and two-family dwellings. Across the United States, sprinkler opponents are pushing state legislation that would restrict a community's ability to make its own decision about model safety codes for new construction. The legislation would prevent any community from implementing any new sprinkler mandates in one- and two-family homes. If it becomes law, such legislation will put lives at risk.

By getting involved, you can help make sure that this law does not pass. Below, you will find resources you can use to help educate others in your

community about the issue, and a letter you can use to let your elected officials know that you do not support any statewide effort to prevent home fire sprinklers. Please be sure to register with our site so we can keep you updated as new information and materials become available. Thank you for your continued commitment to public safety.

States where anti-sprinkler legislation has been filed



State	Bill and scope	Contact state lawmakers
AL	HB 633: Changes the make-up of the promulgating board	House, Senate
AK	SB 129: Prevents locals from adopting sprinkler provision Update: legislative session ended without action on this bill.	House, Senate
AZ	HB 2267: Prevents locals from adopting sprinkler provision Note: Download "Vote NO on HB2267" (PDF, 14 KB)	House, Senate
AR	HB 1839: Prevents locals from adopting sprinkler provision	House, Senate
CT	HB 6204: Prevents locals from amending the state code with more restrictive provisions – no sprinkler reference currently	House, Senate
ID	HB 202: Changes the make-up of the promulgating board HB 218: Prevents locals from adopting sprinkler provision Update: Signed by governor HB 220: Revises membership on state building code board and initially prohibited certain amendments to state building code Update: Signed by governor	House, Senate
IL	HB 592/SB 328: Limits adoption to certain ICC codes (edition year removed) SB 1980: Prevents locals from adopting sprinkler provision Update: Illinois legislation defeated in committee.	House, Senate
ME	LD 440: Prevents locals from adopting sprinkler provision – no sprinkler reference currently Update: Fire service leaders help to stop anti-fire safety legislation	House, Senate
MN	Regulatory Notice: No update to 2009 codes	House, Senate
MO	SB 7 Sect. 67.281: Reduces mandatory requirement to an optional requirement Update: no further action on this bill	House, Senate
NM	HB 0599: Prevents locals from amending the state code with more restrictive provisions – no sprinkler reference currently	House, Senate
NC	S 911: Changes the make-up and scope of the promulgating boards	House, Senate
ND	SB 2354: Prevents locals from adopting sprinkler provision Update: Signed by governor	House, Senate
OH	HB2: Changes the make-up of the promulgating board Update: Fire service leaders help to stop anti-fire safety legislation	House, Senate
SC	HB 3769/ SB 618: Changes the make-up and scope of the promulgating boards	House, Senate

TN	SB2300, HB2318: Removes provision from state code, but allows for local option	House, Senate
TX	HB 00554/SB 820: changes the make-up of the promulgating board HB 01511: sets threshold of 7500 sq. ft. before sprinkler provision can be adopted	House, Senate
UT	HB 0394, SB 0211: Two separate bills – changes make-up and scope of promulgating boards (reduces fire service input) Update: SB 0211 signed by governor	House, Senate

Resources

- Use language in this fill-in-the-blank letter (doc, 29 KB) to encourage your state lawmakers to reject the anti-sprinkler legislation.
  - Download this reproducible fact sheet (PDF, 73 KB) that explains the anti-sprinkler legislation and what you can do to combat the effort.

04/20/2009

How cheap do sprinklers have to become before they're considered cost-effective?

The cost of residential fire sprinkler systems has been a major point raised by builders in the residential fire sprinkler battle. They often cite unknown studies pointing to how many people will not be able to afford a home if the residential (one and two-family) code requirement is adopted.

I recently sat next to an actuary during one of my many flights and engaged in conversation as I often do with my seat mates. Of course, the conversation turned to residential fire sprinklers when he asked what I do for a living. So began the opportunity to take advantage of a "teachable moment" as I explained the whole residential sprinkler issue to this person who, as many persons, had not even thought of this technology when making a home purchase decision.

The very first question he asked after he learned all about this life safety technology was, you guessed it; how much does it cost? I explained about the 1 to 1.5% of a home's cost and the research putting this cost at $1.61 a sq. sprinklered foot. Immediately his mathematical mind went to work and within seconds he said; "That would only translate into approximately $5.00 extra mortgage payment a month" After I got over my awe of his mathematical abilities without the use of a calculator I remembered reading somewhere someone say that the additional mortage amount would equal the cost of a "Big Mac" a month.

During one of the recent hearings, someone provided testimony begging the question posed by the title of this blog. I bring it to you here in its entirety and urge you to make similar analogies, if given the chance, when addressing the cost of residential sprinkler systems. The testimony follows:

"To really look at the issue of the cost impact on homes and whether sprinklers will impact the cost of affordable housing, there is a basic question that has to be asked, "What drives the price of a new home?" In many, if not most, markets, the answer to this question is not construction costs, but instead, what the market will bear, with sales prices rising and falling based on what buyers are willing to pay. In such markets, costs associated with mandatory sprinklers are absorbed into the price by adjusting other costs or features or builder markup.

Even if there is an increase in the cost of a home based on sprinklers, the impact on a monthly mortgage payment is negligible in an average home.

Consider a hypothetical $3,000 sprinkler system in a $300,000 home with a 6.5% mortgage, a 5% credit on a $2,000/year insurance bill, and a combined Federal/State income tax rate of 33%; the net cost of fire sprinklers, after mortgage related tax deductions, would be $4.37 per month. This represents a 0.23% increase in the monthly payment and roughly equates to the cost of a premium beverage at your local coffee shop
So, I pose the question to everyone listening to this program today, just how cheap do sprinklers have to become before they're considered cost-effective?"
Maria Figueroa

Hodge, Vernon (DHCD)

From: Wallace, Clinton (DHCD)
Sent: Wednesday, May 20, 2009 6:49 AM
To: Rodgers, Emory (DHCD); Brock, Larry (DHCD); Dyer, Lorenzo (DHCD); Leatherby, Eric (DHCD); Potts, Richard (DHCD); Negley, Valrae (DHCD)
Cc: Eubank, Paula (DHCD); Hodge, Vernon (DHCD)
Subject: FW: Fire Sprinkler Protection

FYI, a way to test sprinklers in manufactured home if it passes in Virginia.

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Division of Building and Fire Regulation
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From: Richard Weinert [mailto:RWeinert@hcd.ca.gov]
Sent: Tuesday, May 19, 2009 4:21 PM
To: 'King, Timothy (DOS)'; 'Matchneer, William W'; 'MHARRDG@aol.com'; 'MMARKWEISS@AOL.COM'; 'prdaniels@fuquamgmt.com'; 'charles44@ameritech.net'; 'jack.henry@chiefind.com'; 'lkeener@palmharbor.com'; 'rickmurdock@guerdon.com'; 'ronnie@hstr.com'; 'nashua@nashuahomesofidaho.com'; 'scott@heritagehomesandrealty.com'; 'buck@hstr.com'; 'pat@shamrock-homes.com'; 'readm@fourseasonshousing.com'; 'wbell@palmharbor.com'; 'kengeljack@hi-techhousing.com'; 'jweldy@verizon.net'; 'mobile00@frontiernet.net'; 'chartley@taylorhomes.net'; 'Weldonwatson@aol.com'; 'psurles@athensparkhomes.com'; 'DShaffer@patriothomes.com'; 'kenny@rochesterhomesinc.com'; 'jcummings@platinumhomes-llc.com'; 'rlyons@pennlyon.com'; 'jmcgee@modularone.net'; 'bob.phillips@chiefind.com'; 'Tissie114@aol.com'; 'walt2701@earthlink.net'; 'cboyer@hstr.com'; 'Gary.Pritchard@clayton.net'; 'BELLMHKS@DOOR.NET'; 'THOMASHAGAR@MMHA.NET'; 'DJH@SOLITAIREHOMES.COM'; 'Kfoskey@liveoakhomes07.com'; 'GSULLIVAN@liveoakhomes07.com'; 'pknight@championhomes.net'; 'dbatchelor@sehomes.com'; 'kbrown@sehomes.com'; 'dpajakowski@skylinecorp.com'; 'GGINDY500@aol.com'; 'Kathy.Munson@fleetwood.com'; 'charley.lott@fleetwood.com'; 'kip.thrush@fleetwood.com'; 'tomjr@hornerandassociates.com'; 'mark@homesteadhousinginc.com'; 'bbv2008@earthlink.net'; 'foggies2@yahoo.com'; 'Andersonarizona@aol.com'; 'Hworks4u2@aol.com'; 'laddawson@guerdon.com'; 'tdecio@skylinecorp.com'; 'wgriffiths@championhomes.net'; 'leo@forahouse.com'; 'chris@magnoliahomes.biz'; 'JGledhill@championhomes.net'; 'dgraham@tombigbee.com'; 'len.mcgill@fleetwood.com'; 'tom@modular.org'; 'rsvinas@pbsnc.com'; 'ned@fuquahomes-mo.com'; 'albert.g.endres@state.or.us'; 'Benito Martinez'; 'bjohnson@radcoinc.com'; 'chris.stephens@mail.oci.state.ga.us'; 'smith.chuck@hsmv.state.fl.us'; 'darlene.warren@state.tn.us'; 'dreinhard@pfscorporation.com'; 'hajo235@lni.wa.gov'; 'James Bergan'; 'JRothman@pfscorporation.com'; 'mark.luttich@nebraska.gov'; 'MikeZieman@aol.com'; 'mpalmer@trarnold.com'; 'nancy.gephart@dfbls.az.gov'; 'rmarchman@radcoinc.com'; 'rnolan@hwceng.com'; 'rtanger@trarnold.com'; 'steve.bernia@state.co.us'; 'steve.hibner@state.tn.us'; 'tompos@ntainc.com'; 'trodgers@dbs.idaho.gov'; 'Alfred Cocce'; 'Brian Ferris'; 'Cal Steiner'; 'Charles Cook'; 'cbocz@tdhca.state.tx.us'; 'Dan Chapman'; 'Dan Jones'; 'debra.blake@dfbls.az.gov'; 'Don LeBrun'; 'Dwight Davis'; 'Ed Landon'; 'Gary Childer'; 'genehumphrey@mid.state.ms.us'; 'Hazel Stephenson'; 'Irvin Poke'; 'Jimmy.Sloan@amhc.alabama.gov'; 'Joe Garcia'; 'John Leyden'; 'John McMillan'; 'John Reilly'; 'Justin DeWitt'; Kevin Cimini; 'Kevin deGroat'; Dyer, Lorenzo (DHCD); 'Lynne King'; 'mconte@state.pa.us'; 'Mark Long'; 'Mike Anderson'; 'Mike Montoya'; 'mitch.e.woodrum@wv.gov'; 'Paul Govig'; 'Paul Merriman'; 'Peter Desch'; 'Peter Schmidt'; 'randy.vogt@state.mn.us'; 'Rich Bolten'; 'Richelle Wakefield'; 'Ricky Davis'; 'robert.v.leclair@maine.gov'; 'Ron Pleus'; 'sammy.hoover@dps.la.gov'; 'Scott McLellan'; 'Lechowicz, Tina (DOS)'; 'Tom Rodgers'; Wallace, Clinton (DHCD); 'Warren Ducharme'; 'whit.waller@arkansas.gov'; 'BRIAN@mfghome.org'; 'gcardwell@mfghome.org'; 'JEFF@mfghome.org'; 'TLong@mfghome.org'; 'tbeers@mfghome.org'; 'mhcc@kgjewell.com'; 'tpsheahan@cox.net'; 'bill.farish@fleetwood.com'; 'wjlagano@aol.com'; 'Bill Stamer'; 'MHARRDG@AOL.COM'; 'doug@homemart.us'; 'fandrwalter@verizon.net'; 'jdberger@comcast.net'; 'mhcckarlsr@cs.com'; 'graceharbourchurch@yahoo.com'; 'mwade@cavhomesinc.com'; 'lublinerm@energy.wsu.edu'; 'suebrenton@aol.com'; 'mhoai1@aol.com'; 'theresa@statemanufacturedhomes.com'; 'bkessler@palmharbor.com'; 'Greg Scott'; 'Mark Ezzo'; 'Gugliotta, Ted'; 'clifton@classllc.us.com'
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Subject: RE: Fire Sprinkler Protection

The site installation/testing can be easily remedied---see below excerpt from CA firespinkler regulations. I can provide the entire section for anyone if desired.

§ 4320. Requirements for Testing the System

(a) A fire sprinkler system installed during the manufacture of the manufactured home or multi–unit manufactured housing with two dwelling units must be hydrostatically tested both at the manufacturing facility and at the home's installation site.

(1) The hydrostatic test performed at the manufacturing facility:

A. must be conducted on the completely assembled system within any one transportable section; and

B. must subject the system to 100 pounds per square inch (psi) hydrostatic pressure for not less than 2 hours without any loss of pressure or leakage of water. Testing shall be performed in accordance with the applicable product standards.

(2) The person responsible for installing the manufactured home or multi–unit manufactured housing with two dwelling units must hydrostatically test the system again at the home's installation site with the water supply available at the site for at least one hour without any evidence of leakage.

A. The testing must be performed at a minimum of 50 psi; not to exceed 100 psi.

B. A representative of the enforcement agency must witness the test at the installation site during the same visit to the installation site to inspect the installation of the home or dwelling unit.

(b) A fire sprinkler system installed after the manufactured home or multi–unit manufactured housing with two dwelling units is shipped from the manufacturing facility must be hydrostatically tested at the home's installation site.

(1) The person who installed the fire sprinkler system is responsible for performing the test.

(2) A representative of the enforcement agency must witness the test.

(3) The installer must conduct the test on the completely assembled system.

(4) The installer must conduct the test with the water supply available at the home's site for a period of two hours without any evidence of leakage. The testing must be performed at a minimum of 50 psi; not to exceed 100 psi.

From: King, Timothy (DOS) [mailto:Timothy.King@dos.state.ny.us]
Sent: Tuesday, May 19, 2009 9:39 AM

There is one big item that I am surprised nobody has brought up yet. The International Residential Code adopted the requirements for sprinklers, but the requirement was placed in Chapter 29 which is a plumbing section of the Code. In that Chapter the requirements for sprinklers allow for either a NFPA 13D system or the prescriptive requirements found in that Chapter. When you look at those requirements I would think that if HUD did in fact provide the same requirements the design could easily be incorporated in the DAPIA approval process, the inspection of the installation could be easily incorporated by the IPIA inspections and the hook up could be easily incorporated in the AC approval or the on-site completion rule.

If you take the time to look at the requirements you will find that the design flows of the prescriptive requirements look very similar to the fixture unit design of the plumbing sections. That could most likely be designed by the engineer designing the home. There are no requirements for a 300 gallon storage tank that everyone thinks is required. There are no requirements for central monitoring of the system. The prescriptive requirements allow for PEX piping to be used. There are sprinkler heads already available on the market for PEX piping connections and they would be protected from the kids throwing balls at them. The connection to the water supply allows for a minimum 3/4 inch supply. And they do not require closets less then 24 square feet from being protected.

I do not believe that any staff from HUD has suggested that the Manufactured Housing Safety and Construction Standards require the placement of sprinklers in Manufactured Housing, but have only suggested that if a State or Local Government does require sprinklers that the Standard would be already approved and that those standards would then be used for the placement of the sprinklers in the homes.

Sorry I have to get on my soapbox now, but if the things would have been better in the market the last few years and the fees could have supported the funding of a yearly COSAA meetings, with invitations to the Industry to participate in some joint sessions, we could have been discussing this all along. While I am not taking any position on the sprinkler issue, I do know that New York will be presenting the issue regarding sprinklers in manufactured housing to our Code Council for consideration of adoption in the Residential Code of New York State. Before we go in any direction with the need for sprinklers maybe we should decide what type of system (or plumbing requirement) would be acceptable if required by a State or Local Government. It would appear that the prescriptive section of the International Code would allow for a much more cost effective way other than a full blown NFPA 13D System. I'm also not sure if we can wait until the funding is available for another COSAA meeting to start a good dialogue on this issue..

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Recommended Amendments to the 2009 International Residential Code (IRC)

Issue: Automatic Fire Sprinkler System

2009 IRC Section R313

Recommended Amendment
Delete the Section in its entirety as shown below:

~~**R313 AUTOMATIC FIRE SPRINKLER SYSTEMS**~~
~~**R313.1 Townhouse automatic fire sprinkler systems.** An automatic residential fire sprinkler system shall be installed in townhouses.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.~~

~~**R313.1.1 Design and installation.** Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904.~~

~~**R313.2 One- and two-family dwellings automatic fire sprinkler systems.** Effective January 1, 2011, an automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential fire sprinkler system.~~

~~**R313.2.1 Design and Installation.** Automatic residential fire sprinkler systems shall be installed in accordance with Section P2904 or NFPA 13D.~~

National Association of Home Builders
Recommended State & Local Amendments to the
2009 International Residential Code (IRC)

Issue: Automatic Fire Sprinkler System

2009 IRC Section R313

Recommended Amendment
Delete the Section in its entirety as shown below:

~~**R313 AUTOMATIC FIRE SPRINKLER SYSTEMS**~~
~~**R313.1 Townhouse automatic fire sprinkler systems.** An automatic residential fire sprinkler system shall be installed in townhouses.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.~~

~~**R313.1.1 Design and installation.** Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904.~~

~~**R313.2 One- and two-family dwellings automatic fire sprinkler systems.** Effective January 1, 2011, an automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential fire sprinkler system.~~

~~**R313.2.1 Design and Installation.** Automatic residential fire sprinkler systems shall be installed in accordance with Section P2904 or NFPA 13D.~~

Reason:
The purpose of this amendment is to delete the reference of the mandatory requirement of residential sprinkler systems in all one- and two- family dwellings and townhouses. This change will provide the homeowner with the continued ability to choose whether or not a residential fire sprinkler system is appropriate for their situation.

NAHB strongly disagrees with the fire services perception of America's fire problem and the proposed solution to reduce the number of fire fatalities that occur each year. In 1977, less than 0.008% of the housing market was affected by structure fires. In 2005, that number was reduced to less than 0.002%. Over the past three decades, there has a substantial decrease in the number of residential structure fires in relation to the growth

of American housing. No one can predict when or where a fire will occur, but to require every home to be equipped with a residential sprinkler system based on the figures below is not cost-effective.

Consideration as to whether the requirement for fire sprinklers in dwellings be mandatory should remain a local issue. The sole purpose of an Appendix P in the 2006 International Code was to provide local jurisdictions with the means to adopt a code or standard that is applicable to their community. Not every jurisdiction agrees that radon resistant construction, patio coverings, and safety inspections of existing appliances need to be regulated or inspected in their jurisdiction. Contrary to the belief of some activists, several jurisdictions have decided that Appendix P (the provisions for residential sprinkler systems) is not applicable to their state or local jurisdictions. Of the 47 states that have adopted the International Residential Code, none have adopted the 2006 IRC with the inclusion of Appendix P. During the adoption prose in six states, there was a proposal put forth to include appendix P in the formal adoption of the 2006 IRC and the proposal was voted down every time.

According to the U.S. fire administration more than half states in America are below the national fire death rate of 13.6 per million and over the past ten years the number of one- and two- family dwelling fires, deaths and injuries have fallen (6%, 18% and 26% respectively).

While the fire service and sprinkler advocates acknowledge that the median age of a home is 32 years, the connection between fire deaths and the age of the home is elusive. For several years data has been collected for several relevant facts about fires. The cause of the fire, whether smoke alarms were present and were working, type of smoke alarm present, whether the fire was confined and did not activate the sprinkler system.

While there have been no studies conducted to investigate whether fire fatalities are less likely to occur in newer homes, there is supporting evidence of this in reports issued by NFPA regarding the performance of smoke alarms. According to these reports, there is a significant difference in the number of fatalities and the number of fires when the smoke alarm present. This includes information regarding smoke alarms that were either battery operated, hardwired with battery backup or hardwired. According to April 2007 Report "U.S. Experience with Smoke Alarms and other Fire Detection/Alarm Equipment" by Marty Ahrens, 65% of the reported residential home fire deaths occurred in homes where there was no smoke alarm present (43%) or did not operate (22%). Of the 35% fire fatalities that occurred when a smoke alarm was present and operated, it was reported that two-thirds of the non-confined home structure fires occurred in dwellings with battery operated smoke alarms with the remaining third evenly divided between homes with hardwired and hardwired with battery backup.

Source	Code Cycle Required	# of Fires	# of Fatalities	# of Injuries	Property Damage in Millions
Battery only	Before 1982	88,300	1,230	5,850	$2,353
Hardwired Only	1982-1992	19,900	170	1,300	$743
Hardwire/Battery	1992- Present	18,000	210	1,490	$568

Reference: April 2007 Report "U.S. Experience with Smoke Alarms and other Fire Detection/Alarm Equipment" by Marty Ahrens

From this information we can see that as the requirements for smoke alarms changed, as well as other requirements over the years, that the newer stock has had fewer fires and fewer fire fatalities. Along with improvements to the power source, the *National Fire Code* has also increased the number of required smoke alarms in a one- and two- family dwelling over the years. In 1992 it required that all smoke alarms be interconnected.

When you consider the advances made in the requirements of smoke alarms and look at the results in reducing the number of fire fatalities, the solution is educating the public about the importance of working smoke alarms and practicing proper fire prevention.

The most cost-effective means of reducing the loss life is through increasing the public's awareness on the use and maintenance of smoke alarms. According to NFPA reports an estimated 890 live could be saved annually if home were equipped with working smoke alarms. 65% of the reported fire fatalities from 2000-2004 occurred in homes were smoke alarms were either not present or were present but failed to operate. CPSC surveys have shown that while 88% of the households screened had at least one smoke alarm, 72% of these smoke alarms were battery powered only.

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National Association of Home Builders
Recommended State & Local Amendments to the
2009 International Residential Code (IRC)

Issue: Automatic Fire Sprinkler System

2009 IRC Section R313

Recommended Amendment
Delete the Section in its entirety as shown below:

~~R313 AUTOMATIC FIRE SPRINKLER SYSTEMS~~
~~**R313.1 Townhouse automatic fire sprinkler systems.** An automatic residential fire sprinkler system shall be installed in townhouses.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.~~

~~**R313.1.1 Design and installation.** Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904.~~

~~**R313.2 One- and two-family dwellings automatic fire sprinkler systems.** Effective January 1, 2011, an automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential fire sprinkler system.~~

~~**R313.2.1 Design and Installation.** Automatic residential fire sprinkler systems shall be installed in accordance with Section P2904 or NFPA 13D.~~

Reason:
NAHB strongly disagrees with the fire services perception of America's fire problem and the proposed solution to reduce the number of fire fatalities that occur each year. In 1977, less than 0.008% of the housing market was affected by structure fires. In 2005, that number was reduced to less than 0.002%. Over the past three decades, there has a substantial decrease in the number of residential structure fires in relation to the growth of American housing. No one can predict when or where a fire will occur, but to require all homes to be equipped with a residential sprinkler system based on the figures above doesn't make sense.

1. Should the requirement for fire sprinklers in dwellings be a local issue? The sole

purpose of an appendix is to allow local jurisdictions the means to adopt a code or standard that is applicable to their community. Not every jurisdiction agrees that radon resistant construction, patio coverings, and safety inspections of existing appliances need to be regulated or inspected. Contrary to the belief of some activists, several jurisdictions have decided that Appendix P (the provision for residential sprinkler requirement) is not applicable to their state or local jurisdictions. Of the 47 states that adopt the International Residential Code, there have been no states that have adopted the 2006 International Residential Code along with Appendix P. In six states, there was a motion made to include appendix P in the formal adoption of the 2006 IRC and the motion was voted down at the state level. According to the U.S. fire administration more than half states in America are below the national fire death rate of 13.6 per million and over the past ten years the number of one- and two- family dwelling fires, deaths and injuries have fallen (6%, 18% and 26% respectively).

2. While the fire service and sprinkler advocates acknowledge that the median age of a home is 32 years, the connection between fire deaths and the age of the home is still elusive to them. For several years data has been collected for several relevant facts about fires, the cause of the fire, whether smoke alarms were present and were working, type of smoke alarm present, whether the fire was confined or not. With all the information that is gathered and can be determined after the event, one of the most crucial pieces of information that is not gathered is the age of the home. This information could open a whole new realm of understanding about how the home is built and whether or not the codes changes over the course of time have been beneficial.

   While there have been no studies conducted to support or dispute the claim that newer homes are less susceptible to fire, there is supporting evidence in the most recent report issued by NFPA on the performance of smoke alarms. According to the report of the there is a significant difference in the number of fatalities and the number of fires when the smoke alarm present were either battery operated, hardwired with battery backup and hardwired. According to April 2007 Report "U.S. Experience with Smoke Alarms and other Fire Detection/Alarm Equipment" by Marty Ahrens, 65% of the reported residential home fire deaths occurred in homes where there was no smoke alarm present (43%) or did not operate (22%). Of the 35% fire fatalities that occurred when a smoke alarm was present and operated, it was reported that two-thirds of the non-confined home structure fires occurred in dwellings with battery operated smoke alarms with the remaining third evenly divided between homes with hardwired and hardwired with battery backup.

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From this information we can see that as the requirements for smoke alarms changed, as well as other requirements over the years, that the newer stock has had fewer fires and fewer fire fatalities. Along with improvements to the power source, the *National Fire Code* has also increased the number of required smoke alarms in a one- and two- family dwelling over the years and in 1992 it required that all smoke alarms were interconnected. When you consider the advances made in the requirements of smoke alarms and look at the results in reducing the number of fire fatalities, the solution is educating the public about the importance of working smoke alarms and practicing proper fire prevention.

There is a more cost effective means of reducing the loss life that we see every year and that is through increasing public awareness on the use and importance of smoke alarms. According to NFPA reports an estimated 890 live could be saved annually if home were equipped with working smoke alarms. 65% of the reported fire fatalities from 2000-2004 occurred in homes were smoke alarms were either not present or were present but failed to operate. CPSC surveys have shown that while 88% of the households screened had at least one smoke alarm, 72% of these smoke alarms were battery powered only.

It is NAHB's opinion that the figures presented in the proponents substantiation is incorrect when it come to the dollars spent per life saved. According to the Canada Mortgage and Housing Corporation, the cost per life saved would be about $38 million dollars if there were a mandate and NIST has estimated that the cost per life saved would be $35 million. There are trends that are observed and acknowledged by both sprinkler proponents and opponents. That a majority of fire fatalities occur in homes that do not have smoke alarms, or a smoke alarm that is did not operate.

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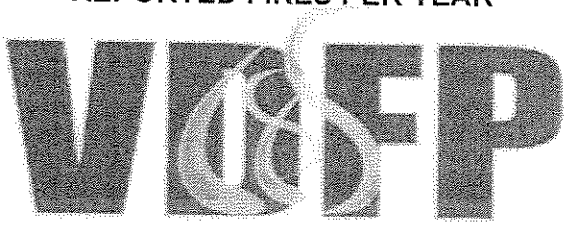
Virginia Residential Building Fires
In 1-or-2 Family Dwellings

REPORTED FIRES PER YEAR



Year	#	%	RT Avg	%<=6	Loss Tot	Loss/Inc	Civ Inj	Civ Death	FS Inj	FS Death	Total Inj/Death	Inj/Death Per 1k Inc.
2000	3,777	8.8%	7:55	56.3%	$48,155,163	$12,750	194	26	107	0	327	87
2001	3,741	8.7%	7:52	56.9%	$47,998,062	$12,830	190	18	81	0	289	77
2002	4,718	11.0%	7:49	51.5%	$76,796,666	$16,277	249	24	112	0	385	82
2003	5,081	11.8%	7:48	49.3%	$204,634,885	$40,275	243	37	111	0	391	77
2004	5,070	11.8%	8:33	42.4%	$87,499,919	$17,258	234	71	96	1	402	79
2005	5,169	12.0%	8:02	42.5%	$107,836,293	$20,862	201	31	83	0	315	61
2006	5,362	12.4%	7:55	43.3%	$190,120,899	$35,457	202	40	80	0	322	60
2007	5,888	13.7%	8:00	42.2%	$139,928,586	$23,765	245	58	91	1	395	67
2008	4,266	9.9%	7:31	44.4%	$92,299,311	$21,636	159	36	81	0	276	65
Total	43,072	100.0%	7:57	47.0%	$995,269,784	$23,107	1,917	341	842	2	3,102	72

9 years - 38 2. (1 PWC Civ)

Source: Virginia Fire Incident Reporting System

Virginia Residential Building Fires

Number of 1-or-2 Family Dwelling Fires with Fire Confined to a Non-Combustible Container

(Jan 2000 - Sep 2008 Combined)

Confined/Non-Confined	#	%	RT Avg	%<=6	Loss Tot	Loss/Inc	Civ Inj	Civ Fatal	FS Inj	FS Fatal	Total Inj/Death	Inj/Death Per 1k Inc.
Building Fire - Not confined	30,189	70.1%	8:00	49.3%	$988,709,796	$32,751	1,749	340	824	2	2,915	97
Building Fire, Confinded	12,883	29.9%	7:51	41.4%	$6,559,988	$509	168	1	18	0	187	15
Total	43,072	100.0%	7:57	47.0%	$995,269,784	$23,107	1,917	341	842	2	3,102	72

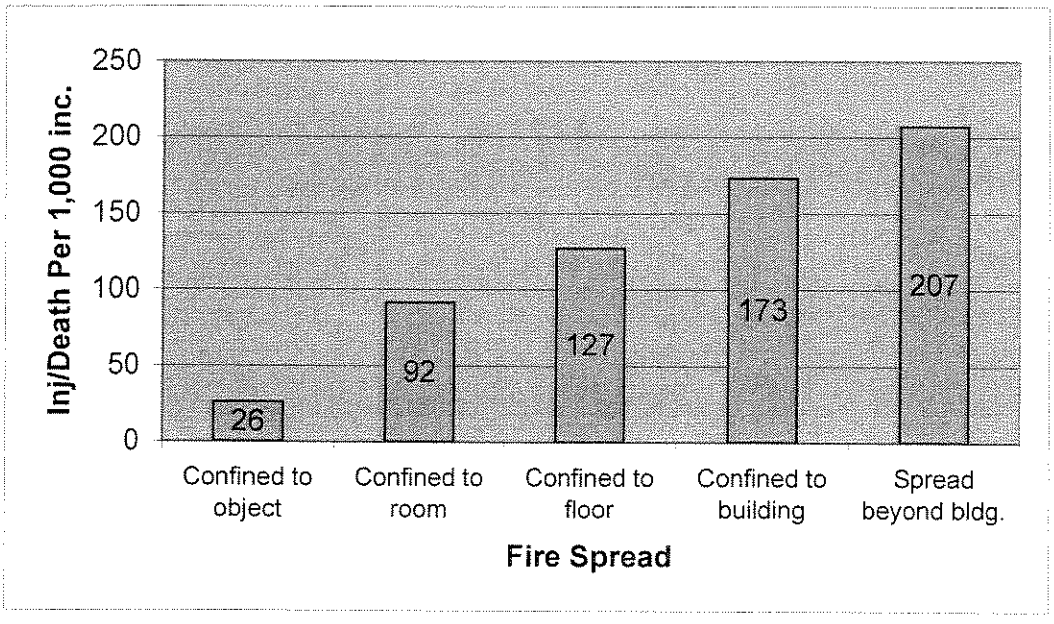
Source: Virginia Fire Incident Reporting System

Virginia Residential Building Fires
In 1-or-2 Family Dwellings

Extent of Fire Spread

(Jan 2000 to Sep 2008 Combined)

Fire Spread Group	#	%	RT Avg	%<=6	Loss Tot	Loss/Inc	Civ Inj	Civ Fatal	FS Inj	FS Fatal	Inj/Death	Inj/Death Per 1k Inc.
Blank	10,729	24.9%	7:48	44.1%	$22,462,619	$2,094	128	9	29	1	167	16
Confined to object	12,010	27.9%	7:38	44.6%	$45,756,030	$3,810	264	12	37	0	313	26
Confined to room	10,338	24.0%	6:48	55.0%	$174,062,725	$16,837	787	49	111	0	947	92
Confined to floor	2,230	5.2%	8:30	54.1%	$73,650,025	$33,027	172	30	82	0	284	127
Confined to building	6,442	15.0%	9:34	42.0%	$558,842,329	$86,750	475	187	454	1	1,117	173
Spread beyond bldg.	1,323	3.1%	11:41	41.5%	$120,496,056	$91,078	91	54	129	0	274	207
Total	43,072	100.0%	7:56	47.0%	$995,269,784	$23,107	1,917	341	842	2	3,102	72

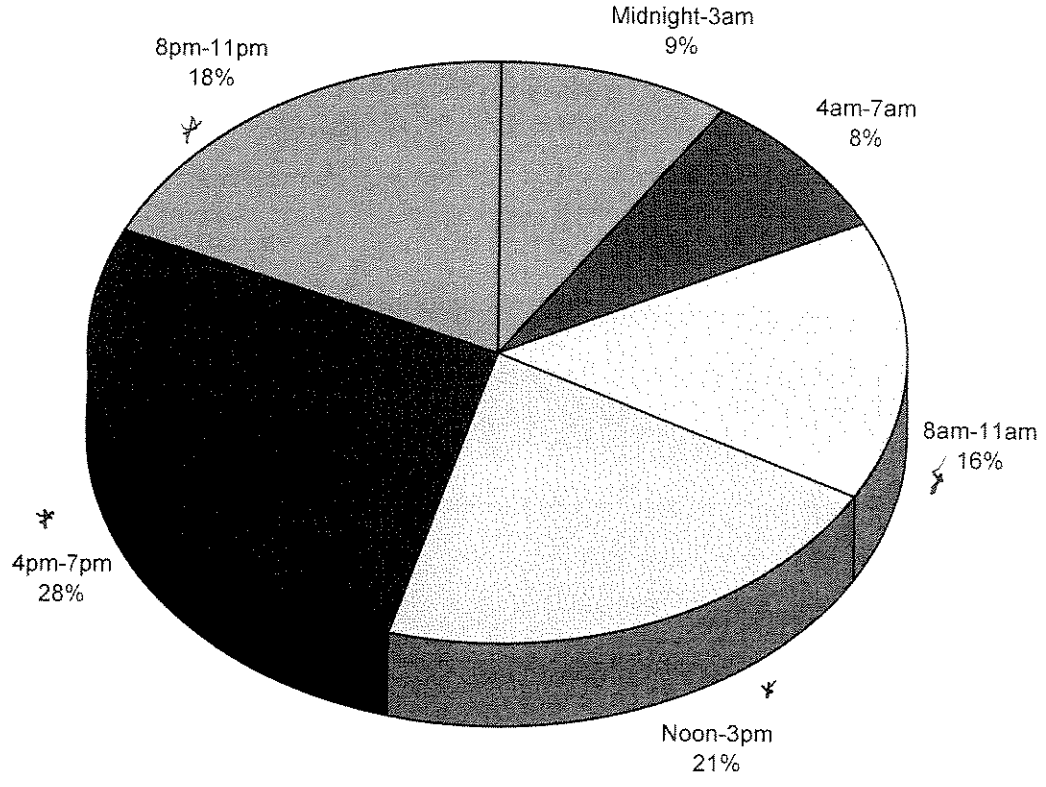


Source: Virginia Fire Incident Reporting System

Virginia Residential Building Fires
in 1-or-2 Family Dwellings
(Jan 2000- Sep 2008 Combined)

VDFP

1-or-2 Family Dwelling Fires by Time of Day

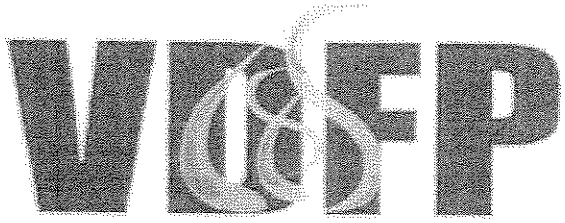


Source: Virginia Fire Incident Reporting System

Virginia Residential Building Fires
In 1-or-2 Family Dwellings

Reported Fires by Locality

(Jan 2000-Sep 2008 Combined)



County/City	#	%	RT Avg	%<=6	Loss Tot	Loss/Inc	Civ Inj	Civ Fatal	FS Inj	FS Fatal	Total Inj/Death	Inj/Death Per 1k Inc.
Accomack County	337	0.8%	9:02	21.7%	$5,944,760	$17,640	4	2	0	0	6	18
Albemarle County	349	0.8%	9:41	20.1%	$10,998,471	$31,514	3	5	2	0	10	29
Alexandria	228	0.5%	4:13	89.9%	$1,506,925	$6,609	14	0	1	0	15	66
Alleghany County	152	0.4%	7:14	46.1%	$2,228,740	$14,663	1	0	2	0	3	20
Amelia County	44	0.1%	13:44	6.8%	$1,761,600	$40,036	0	0	0	0	0	0
Amherst County	265	0.6%	13:00	7.6%	$1,997,860	$7,539	9	0	3	0	12	45
Appomattox County	68	0.2%	11:46	8.8%	$1,581,425	$23,256	0	0	2	0	2	29
Arlington County	294	0.7%	5:54	66.4%	$11,648,317	$39,620	4	1	9	0	14	48
Augusta County	766	1.8%	10:27	17.3%	$8,807,506	$11,498	8	5	10	0	23	30
Bedford	183	0.4%	10:47	15.3%	$2,365,100	$12,924	0	0	0	0	0	0
Bedford County	313	0.7%	12:08	17.3%	$4,111,701	$13,136	1	3	0	0	4	13
Bland County	57	0.1%	18:17	10.5%	$565,700	$9,925	0	0	1	0	1	18
Botetourt County	147	0.3%	13:23	13.6%	$611,350	$4,159	0	2	1	0	3	20
Bristol	237	0.6%	4:09	81.4%	$2,351,645	$9,923	17	1	26	0	44	186
Brunswick County	147	0.3%	12:15	10.9%	$2,071,350	$14,091	0	0	0	0	0	0
Buchanan County	78	0.2%	17:50	9.0%	$2,724,545	$34,930	3	2	0	0	5	64
Buckingham County	90	0.2%	13:44	12.2%	$423,500	$4,706	0	1	0	0	1	11
Buena Vista	77	0.2%	6:19	44.2%	$962,850	$12,505	1	1	1	0	3	39
Campbell County	416	1.0%	11:11	17.8%	$2,298,270	$5,525	0	3	0	0	3	7
Caroline County	98	0.2%	12:46	6.1%	$1,693,350	$17,279	0	0	2	0	2	20
Carroll County	165	0.4%	12:20	5.5%	$2,581,650	$15,646	1	0	2	1	4	24
Charles City County	48	0.1%	15:04	4.2%	$1,298,810	$27,059	0	1	0	0	1	21
Charlotte County	68	0.2%	12:29	7.4%	$2,061,235	$30,312	0	1	1	0	2	29
Charlottesville	370	0.9%	4:55	75.1%	$4,534,017	$12,254	29	2	9	0	40	108
Chesapeake	1,482	3.4%	6:15	49.3%	$27,607,978	$18,629	112	6	25	0	143	96
Chesterfield County	1,571	3.6%	7:55	18.5%	$28,002,405	$17,825	110	12	25	0	147	94
Clarke County	139	0.3%	11:09	13.7%	$1,919,780	$13,811	3	0	2	0	5	36
Colonial Heights	155	0.4%	10:10	50.3%	$1,358,685	$8,766	9	2	6	0	17	110
Covington	101	0.2%	6:06	40.6%	$1,088,854	$10,781	7	1	7	0	15	149
Craig County	34	0.1%	7:51	41.2%	$236,850	$6,966	0	0	0	0	0	0
Culpeper County	193	0.4%	12:39	8.3%	$6,368,852	$32,999	2	1	1	0	4	21
Cumberland County	21	0.0%	10:14	38.1%	$506,250	$24,107	0	0	0	0	0	0
Danville	723	1.7%	4:48	79.9%	$6,323,114	$8,746	45	2	10	0	57	79
Dickenson County	117	0.3%	19:20	4.3%	$2,892,720	$24,724	2	1	10	0	13	111
Dinwiddie County	115	0.3%	12:53	17.4%	$1,701,490	$14,796	1	1	1	0	3	26
Emporia	48	0.1%	6:56	39.6%	$830,500	$17,302	0	0	0	0	0	0

Source: Virginia Fire Incident Reporting System

Virginia Residential Building Fires
In 1-or-2 Family Dwellings

Reported Fires by Locality

(Jan 2000-Sep 2008 Combined)

County/City	#	%	RT Avg	%<=6	Loss Tot	Loss/Inc	Civ Inj	Civ Fatal	FS Inj	FS Fatal	Total Inj/Death	Inj/Death Per 1k Inc.
Essex County	45	0.1%	11:36	15.6%	$1,750,500	$38,900	2	7	1	0	10	222
Fairfax	106	0.2%	8:39	81.1%	$3,326,110	$31,378	4	0	0	0	4	38
Fairfax County	3,623	8.4%	10:43	69.1%	$134,750,299	$37,193	132	24	62	0	218	60
Fauquier County	450	1.0%	11:12	18.3%	$10,365,125	$23,034	5	1	5	0	11	24
Floyd County	126	0.3%	15:27	6.3%	$30,500	$242	0	2	0	0	2	16
Fluvanna County	20	0.0%	8:21	40.0%	$0	$0	0	0	0	0	0	0
Franklin	151	0.4%	5:46	55.0%	$1,495,310	$9,903	2	2	1	0	5	33
Franklin County	443	1.0%	10:54	28.0%	$7,996,310	$18,050	10	5	6	0	21	47
Frederick County	651	1.5%	9:47	26.7%	$3,367,186	$5,172	8	1	11	0	20	31
Fredericksburg	116	0.3%	4:25	81.0%	$1,666,799	$14,369	4	1	2	0	7	60
Galax	180	0.4%	10:46	8.9%	$1,013,550	$5,631	0	0	1	0	1	6
Giles County	79	0.2%	8:43	27.8%	$1,981,427	$25,081	2	2	0	0	4	51
Gloucester County	312	0.7%	7:49	31.8%	$14,033,707	$44,980	15	2	7	0	24	77
Goochland County	163	0.4%	17:06	7.4%	$1,089,656	$6,685	5	2	0	0	7	43
Grayson County	137	0.3%	15:41	7.4%	$24,040,050	$175,475	0	0	0	0	0	0
Greene County	71	0.2%	11:35	19.7%	$7,950	$112	1	0	0	0	1	14
Halifax County	290	0.7%	8:11	43.1%	$5,121,128	$17,659	1	1	0	0	2	7
Hampton	891	2.1%	4:17	80.0%	$10,095,269	$11,330	47	2	13	0	62	70
Hanover County	464	1.1%	10:11	16.6%	$7,072,697	$15,243	7	0	13	0	20	43
Harrisonburg	27	0.1%	4:58	66.7%	$93,205	$3,452	0	0	0	0	0	0
Henrico County	1,900	4.4%	5:52	47.8%	$34,214,671	$18,008	124	8	43	0	175	92
Henry County	424	1.0%	10:54	20.3%	$10,709,150	$25,257	7	9	5	0	21	50
Hopewell	363	0.8%	4:33	76.6%	$2,477,960	$6,826	26	2	4	0	32	88
Isle of Wight County	181	0.4%	7:26	37.4%	$3,062,237	$16,918	4	2	6	0	12	66
James City County	424	1.0%	6:08	50.5%	$10,807,821	$25,490	18	3	12	0	33	78
King and Queen County	30	0.1%	8:56	14.8%	$370	$12	0	0	0	0	0	0
King George County	150	0.3%	11:14	18.0%	$3,055,380	$20,369	5	2	4	0	11	73
King William County	25	0.1%	12:10	4.0%	$474,000	$18,960	1	0	0	0	1	40
Lancaster County	21	0.0%	7:09	33.3%	$571,000	$27,190	0	0	0	0	0	0
Lee County	226	0.5%	12:18	7.1%	$8,383,300	$37,094	3	7	0	0	10	44
Lexington	45	0.1%	7:43	33.3%	$1,816,774	$40,373	0	0	0	0	0	0
Loudoun County	610	1.4%	7:39	37.1%	$20,432,953	$33,497	32	0	25	0	57	93
Louisa County	203	0.5%	11:56	11.4%	$6,041,550	$29,761	1	1	0	0	2	10
Lunenburg County	64	0.1%	8:35	48.4%	$1,526,475	$23,851	1	2	0	0	3	47
Lynchburg	725	1.7%	3:55	88.4%	$5,413,160	$7,466	30	4	22	0	56	77
Madison County	116	0.3%	6:55	51.7%	$0	$0	0	0	0	0	0	0

Source: Virginia Fire Incident Reporting System

Virginia Residential Building Fires
In 1-or-2 Family Dwellings

Reported Fires by Locality

(Jan 2000-Sep 2008 Combined)

County/City	#	%	RT Avg	%<=6	Loss Tot	Loss/Inc	Civ Inj	Civ Fatal	FS Inj	FS Fatal	Total Inj/Death	Inj/Death Per 1k Inc.
Manassas	169	0.4%	5:02	67.5%	$3,661,455	$21,665	17	0	3	0	20	118
Manassas Park	50	0.1%	3:20	80.0%	$2,092,930	$41,859	1	0	0	0	1	20
Martinsville	210	0.5%	4:13	79.0%	$2,703,889	$12,876	19	3	3	0	25	119
Mathews County	59	0.1%	8:17	11.9%	$2,655,350	$45,006	0	0	1	0	1	17
Mecklenburg County	474	1.1%	7:37	43.7%	$4,082,145	$8,612	2	7	4	0	13	27
Middlesex County	13	0.0%	17:05	0.0%	$75,375,500	$5,798,115	0	0	0	0	0	0
Montgomery County	351	0.8%	6:57	49.0%	$3,924,355	$11,180	2	3	1	0	6	17
Nelson County	89	0.2%	15:55	13.5%	$1,809,700	$20,334	0	3	0	0	3	34
New Kent County	51	0.1%	10:00	23.5%	$5,700	$112	0	0	0	0	0	0
Newport News	1,116	2.6%	4:44	68.8%	$13,258,870	$11,881	108	11	20	0	139	125
Norfolk	1,260	2.9%	3:53	91.3%	$12,833,051	$10,185	74	6	68	0	148	117
Northampton County	64	0.1%	10:34	20.3%	$1,028,900	$16,077	4	2	0	0	6	94
Northumberland County	48	0.1%	11:06	10.4%	$1,850,450	$38,551	1	1	0	0	2	42
Norton	21	0.0%	6:34	42.9%	$47,500	$2,262	0	0	0	0	0	0
Nottoway County	78	0.2%	7:37	33.3%	$549,020	$7,039	0	0	1	0	1	13
Orange County	136	0.3%	12:41	11.8%	$2,124,220	$15,619	2	0	1	0	3	22
Page County	190	0.4%	8:37	36.8%	$2,430,200	$12,791	4	0	0	0	4	21
Patrick County	111	0.3%	12:11	10.8%	$3,023,520	$27,239	1	3	0	0	4	36
Petersburg	620	1.4%	5:00	67.1%	$5,421,666	$8,745	71	13	14	0	98	158
Pittsylvania County	461	1.1%	10:49	13.7%	$8,521,176	$18,484	4	4	2	0	10	22
Poquoson	76	0.2%	3:44	85.5%	$804,700	$10,588	1	0	1	0	2	26
Portsmouth	966	2.2%	5:41	70.9%	$11,188,075	$11,582	11	7	10	0	28	29
Powhatan County	172	0.4%	10:48	19.8%	$5,355,330	$31,136	10	2	8	0	20	116
Prince Edward County	103	0.2%	9:48	11.7%	$2,163,485	$21,005	4	4	0	0	8	78
Prince George County	202	0.5%	9:54	18.3%	$1,667,400	$8,254	1	1	1	0	3	15
Prince William County	566	1.3%	6:28	46.1%	$410,000	$724	2	1	0	1	4	7
Pulaski County	285	0.7%	5:49	60.9%	$5,805,807	$20,371	6	3	6	0	15	53
Radford	90	0.2%	4:05	80.0%	$1,557,272	$17,303	2	4	0	0	6	67
Rappahannock County	96	0.2%	12:39	9.4%	$2,859,607	$29,788	0	1	0	0	1	10
Richmond	1,951	4.5%	5:27	78.4%	$36,876,337	$18,901	172	26	70	0	268	137
Richmond County	6	0.0%	10:20	16.7%	$25,500	$4,250	1	0	0	0	1	167
Roanoke	928	2.2%	4:31	80.4%	$15,940,867	$17,178	69	9	23	0	101	109
Roanoke County	418	1.0%	8:34	20.1%	$6,214,973	$14,868	11	2	13	0	26	62
Rockbridge County	200	0.5%	12:59	16.0%	$1,732,450	$8,662	0	1	1	0	2	10
Rockingham County	483	1.1%	11:02	16.8%	$3,827,900	$7,925	10	0	5	0	15	31
Russell County	75	0.2%	11:34	18.7%	$1,188,150	$15,842	0	1	0	0	1	13

Source: Virginia Fire Incident Reporting System

Virginia Residential Building Fires
In 1-or-2 Family Dwellings

Reported Fires by Locality

(Jan 2000-Sep 2008 Combined)

County/City	#	%	RT Avg	%<=6	Loss Tot	Loss/Inc	Civ Inj	Civ Fatal	FS Inj	FS Fatal	Total Inj/Death	Inj/Death Per 1k Inc.
Salem	117	0.3%	10:54	59.8%	$1,202,208	$10,275	7	1	6	0	14	120
Scott County	172	0.4%	13:53	18.0%	$3,680,300	$21,397	2	1	1	0	4	23
Shenandoah County	253	0.6%	12:34	18.2%	$1,964,210	$7,764	2	7	0	0	9	36
Smyth County	220	0.5%	10:46	19.1%	$3,378,470	$15,357	1	1	0	0	2	9
Southampton County	102	0.2%	9:51	13.7%	$1,847,650	$18,114	3	7	3	0	13	127
Spotsylvania County	658	1.5%	8:13	26.7%	$137,217,579	$208,537	28	3	16	0	47	71
Stafford County	246	0.6%	7:43	39.0%	$3,898,426	$15,847	5	0	2	0	7	28
Staunton	205	0.5%	4:19	77.0%	$1,172,231	$5,718	6	1	5	0	12	59
Suffolk	1,006	2.3%	5:23	63.6%	$11,600,775	$11,532	39	4	26	0	69	69
Surry County	31	0.1%	13:26	10.0%	$796,850	$25,705	0	1	2	0	3	97
Sussex County	83	0.2%	7:47	39.8%	$1,860,600	$22,417	1	2	2	0	5	60
Tazewell County	187	0.4%	8:49	28.3%	$2,905,660	$15,538	12	5	5	0	22	118
Virginia Beach	2,357	5.5%	7:40	29.6%	$60,609,930	$25,715	222	24	70	0	316	134
Warren County	95	0.2%	9:18	30.5%	$1,367,190	$14,391	5	3	4	0	12	126
Washington County	273	0.6%	12:13	7.7%	$5,477,100	$20,063	7	7	4	0	18	66
Waynesboro	197	0.5%	3:39	90.8%	$1,838,668	$9,333	10	3	4	0	17	86
Westmoreland County	110	0.3%	9:27	20.9%	$1,919,240	$17,448	1	0	2	0	3	27
Williamsburg	59	0.1%	4:26	78.0%	$309,675	$5,249	6	0	2	0	8	136
Winchester	223	0.5%	3:19	92.4%	$1,433,965	$6,430	18	0	9	0	27	121
Wise County	162	0.4%	9:41	34.0%	$2,906,055	$17,939	8	4	3	0	15	93
Wythe County	255	0.6%	9:44	22.4%	$3,973,380	$15,582	12	1	7	0	20	78
York County	325	0.8%	4:47	69.5%	$4,640,438	$14,278	29	0	11	0	40	123
Total	43,072	100.0%	7:57	47.0%	$995,269,784	$23,107	1,917	341	842	2	3,102	72

Source: Virginia Fire Incident Reporting System

Residential Structure Fire Causes

State: VA **Report Period:** 1/1/08 - 12/31/08

CODE	CATEGORY	FREQ	FREQ %	CIV DTHS	CIV DTHS %	CIV INJS	CIV INJS %	FF DTHS	FF DTH %	FF INJS	FF INJS %	PROP LOSS	PROP LOSS %	CONT LOSS	CONT LOSS %	TOTAL LOSS	TOT LOSS %
01	Incendiary, Suspicious	313	4.17%	4	7.14%	10	3.04%	0	0.00%	16	14.41%	8,346,659	6.90%	1,682,750	5.21%	10,029,409	6.54%
02	Children Playing	28	0.37%	0	0.00%	4	1.22%	0	0.00%	0	0.00%	137,160	0.11%	35,800	0.11%	172,960	0.11%
03	Smoking	131	1.75%	1	1.79%	15	4.56%	0	0.00%	11	9.91%	2,095,690	1.73%	1,200,737	3.72%	3,296,427	2.15%
04	Heating	1,205	16.06%	0	0.00%	8	2.43%	0	0.00%	3	2.70%	2,703,847	2.23%	818,277	2.53%	3,522,124	2.30%
05	Cooking	2,359	31.44%	3	5.36%	108	32.83%	0	0.00%	6	5.41%	3,680,606	3.04%	1,053,711	3.26%	4,734,317	3.09%
06	Electrical Distribution	141	1.88%	3	5.36%	10	3.04%	0	0.00%	3	2.70%	3,905,047	3.23%	1,049,883	3.25%	4,954,930	3.23%
07	Appliances, Air Conditioning	211	2.81%	4	7.14%	25	7.60%	0	0.00%	2	1.80%	3,102,336	2.56%	1,315,660	4.08%	4,417,996	2.88%
08	Open Flame, Ember, Torch	355	4.73%	3	5.36%	27	8.21%	0	0.00%	3	2.70%	9,560,562	7.90%	3,201,732	9.92%	12,762,294	8.32%
09	Other Heat, Flame, Spark	230	3.07%	2	3.57%	7	2.13%	0	0.00%	3	2.70%	5,732,156	4.74%	1,454,438	4.51%	7,186,594	4.69%
10	Other Equipment	47	0.63%	1	1.79%	4	1.22%	0	0.00%	1	0.90%	2,527,180	2.09%	238,880	0.74%	2,766,060	1.80%
11	Natural	107	1.43%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	3,243,875	2.68%	1,207,385	3.74%	4,451,260	2.90%
12	Exposure	237	0.88%	0	0.00%	3	0.91%	0	0.00%	6	5.41%	5,210,206	4.30%	1,047,940	3.25%	6,258,146	4.08%
13	Unknown Cause	2,314	30.78%	35	62.50%	108	32.83%	0	0.00%	57	51.35%	70,816,362	58.49%	17,977,310	55.68%	88,793,672	57.90%
Totals		7,678	100.00%	56	100.00%	329	100.00%	0	100.00%	111	100.00%	121,061,686	100.00%	32,284,503	100.00%	153,346,189	100.00%

Virginia Civilian Fire Deaths
Year 2008 & 2007
By Year by Locality

Yr	Locality	Mon	AlarmDate	Fire Dept	Fire Category	Aid	Ignition Cause	Multiple Deaths	Gender	Age	Race	Injury Cause
2008	Albemarle Co.	Dec	12/11/2008	Albemarle Co.Fire Rescue	Vehicle	Rec'd	Unintentional	No	Male	64	White	Exposed to Fire Product
2008	Albemarle Co.	Jan	1/26/2008	Albemarle Co.Fire Rescue	Structure	Rec'd	Under investigation	No	Male	44	White	Exposed to Fire Product
2008	Arlington Co.	Jul	7/28/2008	Arlington Co. Fire Dept.	Structure	Rec'd	Undetermined	No	Female	84	White	Exposed to Fire Product
2008	Arlington Co.	Mar	3/7/2008	Arlington Co. Fire Dept.	Structure	Rec'd	Under investigation	No	Female	91	White	Exposed to Fire Product
2008	Bedford	Jul	7/23/2008	Bedford Vol. Fire Department	Vehicle	Rec'd	Failure of equip.	No	Female	37		
2008	Danville	Apr	4/10/2008	Danville Fire Department	Structure	Rec'd	Under investigation	No	Male	61	Black	Exposed to Fire Product
2008	Danville	Feb	2/15/2008	Danville Fire Department	Structure	Rec'd	Under investigation	No	Female	50	Black	Exposed to Fire Product
2008	Danville	Jan	1/5/2008	Danville Fire Department	Structure	Rec'd	Under investigation	Yes	Male	62	Black	Exposed to Fire Product
2008	Danville	Jan	1/5/2008	Danville Fire Department	Structure	Rec'd	Under investigation	Yes	Male	65	Black	Exposed to Fire Product
2008	Danville	Jan	1/5/2008	Danville Fire Department	Structure	Rec'd	Under investigation	Yes	Male	75	Black	Exposed to Fire Product
2008	Dinwiddie Co.	Oct	10/20/2008	Namozine Vol. Fire & Res Dept.	Structure	Rec'd	Under investigation	No	Female	55	White	Undetermined
2008	Dinwiddie Co.	Apr	4/1/2008	Dinwiddie Vol. Fire & Rescue	Vehicle	Rec'd	Unintentional	No	Female	43	Undetermined	Exposed to Fire Product
2008	Essex Co.	Dec	12/5/2008	Tappahannock-Essex VFD	Structure	Rec'd	Under investigation	No	Male	44	White	Exposed to Fire Product
2008	Fairfax Co.	Aug	8/8/2008	Fairfax Co. Fire & Rescue	Vehicle	Rec'd	Unintentional	No	Male	15		
2008	Fairfax Co.	Jun	6/17/2008	Fairfax Co. Fire & Rescue	Structure	Rec'd	Unintentional	No	Male	52		
2008	Fairfax Co.	Mar	3/5/2008	Fairfax Co. Fire & Rescue	Structure	Rec'd	Unintentional	No	Male	48		
2008	Fairfax Co.	Mar	3/1/2008	Fairfax Co. Fire & Rescue	Structure	Rec'd	Unintentional	No	Male	57		
2008	Fairfax Co.	Jan	1/12/2008	Fairfax Co. Fire & Rescue	Structure	Rec'd	Intentional	No	Male	39		
2008	Floyd Co.	Aug	8/18/2008	Floyd Co. Vol. Fire Dept. #1	Structure	Rec'd	Unintentional	No	Male	63		
2008	Franklin Co.	Feb	2/23/2008	Frankllin County Emerg Srvs.	Mobile Struct.	Rec'd	Under investigation	No	Male	74	White	Exposed to Fire Product
2008	Goochland Co.	Jun	6/18/2008	Goochand Co. Fire/Rescue	Structure	Rec'd	Under investigation	No	Female	75	White	
2008	Hampton	Dec	12/4/2008	Hampton Fire Department	Structure	Rec'd	Unintentional	Yes	Female	9		Caught or trapped
2008	Hampton	Dec	12/4/2008	Hampton Fire Department	Structure	Rec'd	Unintentional	Yes	Male	8		Caught or trapped
2008	Hampton	Dec	12/4/2008	Hampton Fire Department	Structure	Rec'd	Unintentional	Yes	Female	72	Black	Exposed to Fire Product
2008	Hampton	Jun	6/22/2008	Hampton Fire Department	Vehicle	Rec'd	Unintentional	No	Male	21		Undetermined

Virginia Civilian Fire Deaths
Year 2008 & 2007
By Year by Locality

Yr	Locality	Mon	AlarmDate	Fire Dept	Fire Category	Aid	Ignition Cause	Multiple Deaths	Gender	Age	Race	Injury Cause
2008	Harrisonburg	Feb	2/16/2008	Harrisonburg Fire Dept.	Structure	Rec'd	Unintentional	No	Male	70	Other	Undetermined
2008	Henrico Co.	Sep	9/24/2008	Henrico Division of Fire	Structure	Rec'd	Under investigation	Yes	Female	0		
2008	Henrico Co.	Sep	9/24/2008	Henrico Division of Fire	Structure	Rec'd	Under investigation	Yes	Female	34	Asian	Undetermined
2008	Henrico Co.	Sep	9/24/2008	Henrico Division of Fire	Structure	Rec'd	Under investigation	Yes	Female	28	Asian	Undetermined
2008	Henrico Co.	Jan	1/21/2008	Henrico Division of Fire	Structure	Rec'd	Under investigation	No	Male	49	White	Undetermined
2008	Henrico Co.	Jan	1/7/2008	Henrico Division of Fire	Structure	Rec'd	Other	No	Female	52	White	Exposed to Fire Product
2008	Henry Co.	Feb	2/29/2008	Dyer's Store Vol. Fire Dept.	Structure	Rec'd	Unintentional	No	Male	47		Undetermined
2008	James City Co.	Nov	11/8/2008	James City Co. Fire Dept.	Mobile Struct.	Rec'd	Under investigation	No	Male	77	Black	Exposed to Fire Product
2008	James City Co.	Jan	1/5/2008	James City Co. Fire Dept.	Structure	Rec'd	Under investigation	No	Male	77	White	Exposed to Fire Product
2008	King George Co.	Jun	6/27/2008	King George Emergency Srvs	Structure	Rec'd	Failure of equip.	No	Female	77	White	Exposed to toxic fumes, no smoke
2008	Loudoun Co.	Jul	7/2/2008	Aldie Vol. Fire Dept.	Vehicle	Rec'd	Unintentional	No	Female	20		
2008	Martinsville	Nov	11/20/2008	Martinsville Fire Department	Structure	Rec'd	Under investigation	No	Male	45		Undetermined
2008	Martinsville	Jul	7/4/2008	Martinsville Fire Department	Structure	Rec'd	Under investigation	No	Male	62	White	Exposed to Fire Product
2008	Nelson Co.	Jan	1/30/2008	Lovingston Vol. Fire Dept.	Structure	Rec'd	Under investigation	Yes	Female	38		
2008	Nelson Co.	Jan	1/30/2008	Lovingston Vol. Fire Dept.	Structure	Rec'd	Under investigation	Yes	Male	11		
2008	Newport News	Jul	7/9/2008	Newport News Fire Dept.	Vehicle	Rec'd	Under investigation	No	Male	52	White	Exposed to Fire Product
2008	Newport News	Jun	6/27/2008	Newport News Fire Dept.	Structure	Rec'd	Unintentional	No	Male	19		Exposed to Fire Product
2008	Petersburg	Jun	6/22/2008	Petersburg Fire and Rescue	Structure	Rec'd	Failure of equip.	No	Female	53		Exposed to Fire Product
2008	Powhatan Co.	May	5/27/2008	Powhatan Co. Vol. Fire Dept.	Structure	Rec'd	Under investigation	No	Female	1	White	Undetermined
2008	Radford	Feb	2/4/2008	Radford Fire Department	Structure	Rec'd	Failure of equip.	No	Male	34	White	Exposed to Fire Product
2008	Richmond	Dec	12/28/2008	Richmond Fire/Emergency Srv	Structure	Rec'd	Under investigation	No	Female	76	White	Undetermined

Virginia Civilian Fire Deaths
Year 2008 & 2007
By Year by Locality

Yr	Locality	Mon	AlarmDate	Fire Dept	Fire Category	Aid	Ignition Cause	Multiple Deaths	Gender	Age	Race	Injury Cause
2008	Richmond	Feb	2/19/2008	Richmond Fire/Emergency Srv	Structure	Rec'd	Under investigation	No	Female	89	Black	Exposed to Fire Product
2008	Roanoke	Jul	7/12/2008	Roanoke Dept. of Fire-EMS	Vehicle	Rec'd	Unintentional	No	Male	25	Undetermined	Exposed to Fire Product
2008	Roanoke Co.	Oct	10/28/2008	Roanoke Co. Fire & Rescue	Structure	Rec'd	Undetermined	No	Male	58		Exposed to Fire Product
2008	Shenandoah Co.	Jan	1/16/2008	Woodstock Fire Dept.	Structure	Rec'd	Under investigation	No	Male	71	White	
2008	Smyth Co.	Dec	12/7/2008	Saltville Vol. Fire Dept.	Structure	Rec'd	Failure of equip.	No	Male	53	White	Exposed to Fire Product
2008	Southampton Co.	Feb	2/9/2008	Boykins Vol. Fire Dept.	Structure	Rec'd	Under investigation	No	Male	35	Black	Undetermined
2008	Spotsylvania Co.	Apr	4/11/2008	Spotsylvania Fire & Rescue	Other	Rec'd	Intentional	No	Male	15		Exposed to Fire Product
2008	Spotsylvania Co.	Jan	1/8/2008	Spotsylvania Fire & Rescue	Structure	Rec'd	Unintentional	No	Female	32		Other
2008	Surry Co.	Jun	6/26/2008	Claremont Vol. Fire Dept.	Structure	Rec'd	Under investigation	No	Male	55		
2008	Sussex Co.	Dec	12/14/2008	Stony Creek Vol. Fire Dept.	Structure	Rec'd	Unintentional	No	Male	75	Black	
2008	Virginia Beach	Jul	7/23/2008	Virginia Beach Fire Dept.	Structure	Rec'd	Unintentional	No	Male	50	White	Undetermined
2008	Virginia Beach	Apr	4/14/2008	Virginia Beach Fire Dept.	Structure	Rec'd	Unintentional	No	Male	50		Exposed to Fire Product
2008	Virginia Beach	Feb	2/5/2008	Virginia Beach Fire Dept.	Structure	Rec'd	Unintentional	No	Female	60	White	Exposed to Fire Product
2008	Warren Co.	Apr	4/17/2008	Front Royal Vol. Fire Dept.	Structure	Rec'd	Under investigation	Yes	Female	8		Exposed to Fire Product
2008	Warren Co.	Apr	4/17/2008	Front Royal Vol. Fire Dept.	Structure	Rec'd	Under investigation	Yes	Female	4		Exposed to Fire Product
2008	Westmoreland Co.	Dec	12/24/2008	Colonial Beach Vol. Fire Dept.	Mobile Struct.	Rec'd	Under investigation	No	Male	82		Exposed to Fire Product
2008	Winchester	Jan	1/18/2008	Winchester Fire & Rescue	Structure	None	Under investigation	No	Male	50		
2007	Augusta Co.	May	5/17/2007	Dooms/Wilson Vol. Fire Dept.	Structure	Rec'd	Unintentional	No	Female	45		
2007	Augusta Co.	Jan	1/27/2007	Verona Fire Dept.	Structure	Rec'd	Unintentional	No	Female	45	White	Exposed to Fire Product
2007	Bedford Co.	Feb	2/7/2007	Huddleston Vol. Fire Dept.	Structure	Rec'd	Undetermined	Yes	Female	29		
2007	Bedford Co.	Feb	2/7/2007	Huddleston Vol. Fire Dept.	Structure	Rec'd	Undetermined	Yes	Female	11		
2007	Bedford Co.	Feb	2/7/2007	Huddleston Vol. Fire Dept.	Structure	Rec'd	Undetermined	Yes	Female	4		
2007	Bristol	Jun	6/10/2007	Bristol Fire Dept.	Structure	Rec'd	Under investigation	No	Female	62	White	Exposed to Fire Product
2007	Buckingham Co.	Jan	1/1/2007	Glenmore Vol. Fire Dept.	Vehicle	Rec'd	Unintentional	No	Male	25		
2007	Charlotte Co.	Apr	4/20/2007	Drake Branch Vol. Fire Dept.	Structure	Rec'd	Unintentional	No	Male	68		

Virginia Civilian Fire Deaths
Year 2008 & 2007
By Year by Locality

Yr	Locality	Mon	AlarmDate	Fire Dept	Fire Category	Aid	Ignition Cause	Multiple Deaths	Gender	Age	Race	Injury Cause
2007	Charlottesville	Mar	3/18/2007	Charlottesville Fire Dept.	Structure	Rec'd	Under investigation	No	Male	25		Exposed to Fire Product
2007	Chesapeake	Aug	8/5/2007	Chesapeake Fire Department	Other	Rec'd	Unintentional	No	Female	71	White	Exposed to Fire Product
2007	Chesapeake	Jun	6/27/2007	Chesapeake Fire Department	Other	Rec'd	Unintentional	No	Female	59	White	Exposed to Fire Product
2007	Chesterfield Co.	Dec	12/3/2007	Chesterfield Fire & EMS	Structure	Rec'd	Unintentional	No	Male	60	Black	Exposed to Fire Product
2007	Chesterfield Co.	Sep	9/1/2007	Chesterfield Fire & EMS	Vehicle	Rec'd	Unintentional	No	Female	50		Exposed to Fire Product
2007	Chesterfield Co.	Mar	3/3/2007	Chesterfield Fire & EMS	Structure	Rec'd	Intentional	Yes	Male	10		Exposed to Fire Product
2007	Chesterfield Co.	Mar	3/3/2007	Chesterfield Fire & EMS	Structure	Rec'd	Intentional	Yes	Male	40		Exposed to Fire Product
2007	Chesterfield Co.	Mar	3/3/2007	Chesterfield Fire & EMS	Structure	Rec'd	Intentional	Yes	Female	70		Exposed to Fire Product
2007	Chesterfield Co.	Mar	3/2/2007	Chesterfield Fire & EMS	Structure	Rec'd	Unintentional	Yes	Male	13	Black	Exposed to Fire Product
2007	Chesterfield Co.	Mar	3/2/2007	Chesterfield Fire & EMS	Structure	Rec'd	Unintentional	Yes	Male	11	Black	Exposed to Fire Product
2007	Colonial Heights	Jun	6/27/2007	Colonial Heights Fire Dept.	Structure	Rec'd	Other	No	Male	45	White	Exposed to Fire Product
2007	Covington	Oct	10/19/2007	Covington Fire Department	Structure	Rec'd	Undetermined	No	Female	77	White	Exposed to Fire Product
2007	Dickenson Co.	Apr	4/21/2007	Haysi VFD	Structure	Rec'd	Under investigation	No	Male	50	White	Exposed to toxic fumes, no smoke
2007	Fairfax Co.	Dec	12/28/2007	Fairfax Co. Fire & Rescue	Structure	Rec'd	Under investigation	Yes	Female	16		
2007	Fairfax Co.	Dec	12/28/2007	Fairfax Co. Fire & Rescue	Structure	Rec'd	Under investigation	Yes	Female	13		
2007	Fairfax Co.	Jan	1/20/2007	Fairfax Co. Fire & Rescue	Structure	Rec'd	Under investigation	No	Female	91		
2007	Fauquier Co.	Mar	3/16/2007	Warrenton Volunteer Fire Co.	Vehicle	Rec'd	Under investigation	No	Male	22		Exposed to Fire Product
2007	Franklin	Feb	2/1/2007	Franklin Fire & Rescue Dept.	Structure	Rec'd	Undetermined	No	Male	0	Black	
2007	Franklin Co.	Mar	3/18/2007	Franklin County Emerg Srvs.	Structure	Rec'd	Failure of equip.	No	Female	73	White	Exposed to Fire Product
2007	Franklin Co.	Mar	3/18/2007	Rocky Mount Fire Dept.	Mobile Struct.	Rec'd	Unintentional	No	Female	73	White	
2007	Franklin Co.	Jan	1/28/2007	Franklin County Emerg Srvs.	Mobile Struct.	Rec'd	Failure of equip.	No	Female	78	White	Exposed to Fire Product
2007	Franklin Co.	Jan	1/28/2007	Glade Hill Fire Dept.	Structure	Rec'd	Under investigation	No	Female	76		Undetermined
2007	Giles Co.	Apr	4/5/2007	Eggleston Vol. Fire Dept.	Structure	Rec'd	Unintentional	No	Female	74	White	Exposed to Fire Product
2007	Hampton	Feb	2/17/2007	Hampton Fire Department	Structure	Rec'd	Under investigation	Yes	Male	58	White	Exposed to Fire Product
2007	Hampton	Feb	2/17/2007	Hampton Fire Department	Structure	Rec'd	Under investigation	Yes	Female	81	White	Exposed to Fire Product

Virginia Civilian Fire Deaths
Year 2008 & 2007
By Year by Locality

Yr	Locality	Mon	AlarmDate	Fire Dept	Fire Category	Aid	Ignition Cause	Multiple Deaths	Gender	Age	Race	Injury Cause
2007	Henry Co.	Dec	12/22/2007	Ridgeway Vol. Fire Dept.	Structure	Rec'd	Failure of equip.	No	Male	31		
2007	King George Co.	Nov	11/14/2007	King George Emergency Srvs	Structure	Rec'd	Under investigation	No	Male	72	Black	Undetermined
2007	Lee Co.	Apr	4/6/2007	Pennington Gap Vol. Fire Dept.	Structure	Rec'd	Undetermined	Yes	Male	50		
2007	Lee Co.	Apr	4/6/2007	Pennington Gap Vol. Fire Dept.	Structure	Rec'd	Undetermined	Yes	Female	11		
2007	Lynchburg	Jan	1/20/2007	Lynchburg Fire Department	Structure	Rec'd	Under investigation	No	Male	33	White	Undetermined
2007	Mecklenburg Co.	Mar	3/22/2007	South Hill Vol. Fire Dept.	Structure	Rec'd	Under investigation	No	Female	70	Black	Exposed to Fire Product
2007	Montgomery Co.	Nov	11/25/2007	Blacksburg Fire Department	Structure	Rec'd	Unintentional	No	Female	85		
2007	Newport News	Dec	12/23/2007	Newport News Fire Dept.	Structure	Rec'd	Unintentional	No	Female	53		Fell, slipped, tripped
2007	Newport News	Apr	4/14/2007	Newport News Fire Dept.	Structure	Rec'd	Undetermined	No	Female	32		Undetermined
2007	Newport News	Feb	2/26/2007	Newport News Fire Dept.	Structure	Rec'd	Unintentional	No	Female	51		Caught or trapped
2007	Newport News	Jan	1/17/2007	Newport News Fire Dept.	Structure	Rec'd		No	Female	22		Other
2007	Orange Co.	Apr	4/1/2007	Orange Vol. Fire Dept.	Vehicle	Rec'd	Unintentional	No	Male	17	White	Caught or trapped
2007	Petersburg	Nov	11/28/2007	Petersburg Fire and Rescue	Structure	Rec'd	Undetermined	Yes	Female	16		Exposed to Fire Product
2007	Petersburg	Nov	11/28/2007	Petersburg Fire and Rescue	Structure	Rec'd	Undetermined	Yes	Female	7		Exposed to Fire Product
2007	Petersburg	Nov	11/28/2007	Petersburg Fire and Rescue	Structure	Rec'd	Undetermined	Yes	Male	0		Exposed to Fire Product
2007	Petersburg	Jul	7/7/2007	Petersburg Fire and Rescue	Structure	Rec'd	Intentional	No	Female	0		Undetermined
2007	Petersburg	Jan	1/12/2007	Petersburg Fire and Rescue	Structure	Rec'd	Undetermined	Yes	Male	16		Exposed to Fire Product
2007	Petersburg	Jan	1/12/2007	Petersburg Fire and Rescue	Structure	Rec'd	Undetermined	Yes	Male	4		Exposed to Fire Product
2007	Petersburg	Jan	1/12/2007	Petersburg Fire and Rescue	Structure	Rec'd	Undetermined	Yes	Female	11		Exposed to Fire Product
2007	Portsmouth	Jan	1/16/2007	Portsmouth Fire Department	Structure	Rec'd	Undetermined	No	Female	75	Black	Exposed to Fire Product
2007	Prince Edward Co.	Mar	3/3/2007	Farmville Vol. Fire Dept.	Structure	Rec'd	Undetermined	Yes	Male	22	White	Exposed to Fire Product
2007	Prince Edward Co.	Mar	3/3/2007	Farmville Vol. Fire Dept.	Structure	Rec'd	Undetermined	Yes	Male	0	White	Exposed to Fire Product
2007	Richmond	Oct	10/28/2007	Richmond Fire/Emergency Srv	Structure	Rec'd	Intentional	No	Female	49		
2007	Richmond	Aug	8/15/2007	Richmond Fire/Emergency Srv	Structure	Rec'd	Undetermined	No	Male			Exposed to Fire Product
2007	Richmond	Aug	8/9/2007	Richmond Fire/Emergency Srv	Structure	Rec'd	Other	No	Male			
2007	Richmond	Jun	6/6/2007	Richmond Fire/Emergency Srv	Vehicle	Rec'd	Undetermined	No	Unknown			Caught or trapped
2007	Richmond	Mar	3/26/2007	Richmond Fire/Emergency Srv	Structure	Rec'd	Unintentional	Yes	Female	4		Exposed to Fire Product
2007	Richmond	Mar	3/26/2007	Richmond Fire/Emergency Srv	Structure	Rec'd	Unintentional	Yes	Female	2		Exposed to Fire Product
2007	Roanoke	Feb	2/18/2007	Roanoke Dept. of Fire-EMS	Structure	Rec'd	Under investigation	No	Male	40	Black	Exposed to Fire Product

Virginia Civilian Fire Deaths
Year 2008 & 2007
By Year by Locality

Yr	Locality	Mon	AlarmDate	Fire Dept	Fire Category	Aid	Ignition Cause	Multiple Deaths	Gender	Age	Race	Injury Cause
2007	Russell Co.	Dec	12/23/2007	Belfast-Rosedale VFD	Structure	Rec'd	Under investigation	No	Male	47	White	Exposed to Fire Product
2007	Shenandoah Co.	Jan	1/5/2007	Strasburg Vol. Fire Dept.	Vehicle	Rec'd	Unintentional	No	Female	99		Exposed to Fire Product
2007	Spotsylvania Co.	Jun	6/6/2007	Spotsylvania Fire & Rescue	Structure	Rec'd	Unintentional	No	Female	33		Undetermined
2007	Suffolk	May	5/26/2007	Suffolk Fire Department	Vehicle	Rec'd	Unintentional	No	Male	1		
2007	Sussex Co.	Oct	10/23/2007	Sussex Courthouse VFD	Vehicle	Rec'd	Undetermined	No	Male	18		
2007	Tazewell Co.	Mar	3/24/2007	Richlands Vol. Fire Dept.	Structure	Rec'd	Under investigation	No	Female	46		
2007	Virginia Beach	Jun	6/15/2007	Virginia Beach Fire Dept.	Structure	Rec'd	Intentional	No	Male	10	Black	Exposed to Fire Product
2007	Virginia Beach	May	5/26/2007	Virginia Beach Fire Dept.	Structure	Rec'd	Under investigation	No	Female	80	Black	Exposed to Fire Product
2007	Virginia Beach	May	5/8/2007	Virginia Beach Fire Dept.	Structure	Rec'd	Under investigation	No	Male	23	White	Exposed to Fire Product
2007	Virginia Beach	Jan	1/21/2007	Virginia Beach Fire Dept.	Structure	Rec'd	Under investigation	No	Female	86	White	Exposed to Fire Product
2007	Washington Co.	Feb	2/19/2007	Goodson Dis. Vol. Fire Dept.	Structure	Rec'd	Unintentional	Yes	Female	62	White	
2007	Wise Co.	Feb	2/20/2007	Wise Vol. Fire Dept.	Structure	Rec'd	Failure of equip.	No	Male	74	White	Exposed to Fire Product
2007	Wise Co.	Feb	2/11/2007	Wise Vol. Fire Dept.	Structure	Rec'd	Failure of equip.	Yes	Male	55	White	Exposed to Fire Product
2007	Wise Co.	Feb	2/11/2007	Wise Vol. Fire Dept.	Structure	Rec'd	Failure of equip.	Yes	Female	47	White	Exposed to Fire Product

Source: Virginia Fire Incident Reporting System as of 02/15/2009
Note: Only include fire incidents from primary fire departments with a reported severity code of death.

EXECUTIVE SUMMARY

On May 25, 2008, fire and rescue personnel from Loudoun County responded to a structure fire at 43238 Meadowood Court in Leesburg, Virginia. During the course of the incident, seven responders were injured. Of those injured, four firefighters received significant burn injuries, two firefighters sustained orthopedic injuries, and one EMS provider was treated for minor respiratory distress. Given the severity of the injuries and magnitude of the event, an independent Investigative Team was assembled to review the incident.

Specifically, the Team was tasked with reviewing "the events leading up to the incident, the incident operation(s), the firefighter MAYDAY(s), and incident mitigation."

The Department of Fire, Rescue, and Emergency Management – Fire Marshal's Office and the Virginia Occupational Safety and Health Compliance Program (VOSH) also performed separate, independent, investigations into the Meadowood Court incident.

This *Investigative Report* contains the results of the Team's comprehensive review and analysis. All of the information presented is factual and was validated by multiple sources prior to inclusion in this document. It is important to note that the Investigative Team had months to examine the incident and develop recommendations. In contrast, the first personnel to arrive on the scene had only seconds to make critical decisions and take action.

The Team determined that several major factors adversely affected the sequence of events on Meadowood Court, including:

- Supplemental Information
- Situational Awareness
- Strategy and Tactics
- Effective Firefighting Force
- Lightweight Building Construction and Materials
- Fire Behavior

Supplemental Information: Personnel in the Emergency Communications Center (ECC) obtained information from the 911 caller indicating that there was fire on the first floor and that it appeared nobody was inside the structure. This critical supplemental information was not provided to responding units or command officers.

Situational Awareness: The first arriving officer did not complete a full, 360° walk around/size-up of the structure nor did personnel observe the fire on the first floor as they entered the structure.

Strategy and Tactics: Based on the officers' perception of conditions, first-arriving crews initiated an offensive fire attack and primary search on the second floor of the structure, which allowed the fire to grow unchecked on the first floor.

Effective Firefighting Force: The first arriving units, Reserve Engine 6 and Tower 6, were at minimum staffing and responded with three personnel each. These units operated on scene for nearly six minutes prior to the arrival of a command officer or another tactical unit. During this time, personnel had numerous fireground tasks to complete, as quickly as possible. As a result, personnel were required to complete multiple tasks, which diverted their attention from their primary assignment.

Specifically, both apparatus operators were involved with laddering and ventilating the structure, leaving the pump panel unattended. In addition, both the Reserve Engine and Tower Officer were engaged in tactical operations, which diminished their ability to supervise, observe changes in the fire conditions, maintain overall situational awareness, and provide command with ongoing status reports.

Building Construction/Fire Behavior: The combination of lightweight building materials, vinyl siding, combustible sheathing, and the significant interior fire load on the first floor of the structure contributed to rapid fire spread. The fire quickly developed to the point of flashover, which trapped the personnel on the second floor of the structure.

The Team also determined several key factors that favorably affected the incident's outcome:

Firefighter Self-Rescue and Situational Awareness

- The Reserve Engine Officer recognized deteriorating interior conditions and rapidly led personnel out of the structure.
- The Tower Officer persevered under extreme circumstances to exit the structure.
- The Tower Firefighter maintained composure, in deteriorating conditions, and transmitted critical directions regarding ladder placement from the interior of the structure.
- The Reserve Engine Firefighter maintained composure and stayed with the crew during the exit from the structure.
- The four injured firefighters' Personal Protective Equipment (PPE) and Self-Contained Breathing Apparatus (SCBA) performed properly under extreme conditions, protecting them against more severe thermal or respiratory injuries.

Fireground Operations

- The first-arriving apparatus driver/operators placed ladders quickly, which provided a means of escape for interior personnel.

Command and Control

- The Incident Commander immediately acknowledged the firefighter MAYDAY.
- Command recognized the need to evacuate the structure.

Training

- All four of the firefighters operating inside the structure had successfully completed the Virginia Department of Fire Programs' MAYDAY Firefighter Down! curriculum.
- All four firefighters operating on the interior of the structure had participated in the Montgomery County (MD) Department of Fire and Rescue Services flashover simulator training program.

Building Construction

- The dimensional lumber floor joists supporting the second floor remained intact throughout the incident, which avoided a floor collapse, allowing firefighters to escape.

Finally, recommendations are provided throughout the *Report* in an effort to provide a framework to enhance and improve the Loudoun County Fire and Rescue System as well as protect responder and citizen safety.

Wood Floor Failures, Excerpted from RR-252, National Research Council of Canada, Study of Unprotected Floor Assemblies in Basement Fire Scenarios.

Table 8. Time to Failure of Unprotected Floor Assemblies

	Open basement doorway		Closed basement doorway	
Assemblies tested	**Test**	*t* ,(s)	**Test**	*t,(s)*
Solid wood joist (235 mm depth)	UF-01	740	UF-02	1200
Wood I-joist A (302 mm depth)	UF-03	490	UF-09	778
Steel C-joist (203 mm depth)	UF-04	462	-	-
Metal-plate wood truss (305 mm depth)	UF-05	469	-	-
Wood I-joist B (302 mm depth)	UF-06	382	-	-
	UF-06R	380	-	-
	UF-06RR	414	-	-
Metal web wood truss (302 mm depth)	UF-07	325	UF-08	474

Note: In addition to the solid wood joist assembly, two engineered floor assemblies - one with the longest time and the other with the shortest time to reach failure in the open basement doorway scenario - were selected for testing with the closed basement doorway.

Timelines:

Floor Assembly Type	Test	First Alarm	OD = 2 m^{-1}	FED=0.3-1 1st storey	FED=0.3-1 2nd storey	Structural Failure
Tests with open basement doorway						
Solid wood joist	UF-01	40	185	*205-235*	225-255	740
Wood I-joist A	UF-03	48	183	**205-213**	225-247	490
Steel C-joist	UF-04	30	195	**207-215**	*245-280*	462
Metal-plate wood truss	UF-05	40	190	*206-232*	*235-260*	469
Wood I-joist B	UF-06	45	170	198-211	*208-241*	382
	UF-06R	38	161	198-199	*207-241*	380
	UF-06RR	43	184	*203-216*	218-248	414
Metal web wood truss	UF-07	40	170	**192-207**	*230-255*	325
Tests with closed basement doorway						
Solid wood joist	UF-02	42	297	466-676	*362-501*	1200
Metal web wood truss	UF-08	50	360	*400-486*	*375-510*	474
Wood I-joist A	UF-09	44	319	329-484	*364-504*	778

1. Values determined using the measurements at 1.5 m height (for gas concentrations and 00) or 1.4 m height (for temperatures);
2. The number with the *italic* font **represents the calculated time for reaching the CO incapacitation** dose, while the number in bold represents the calculated time for reaching the heat incapacitation dose, whichever occurred first;
3. All values shown in the table are before fire suppression.

The case for HOME FIRE SPRINKLERS

NFPA's new advocacy campaign calls for sprinklers in every new one- and two-family home in the country. Here's how you can get involved. *By Scott Sutherland*

On Janauary 5, John Robert Ray, chief of the Anne Arundel County Fire Department in Maryland, sat before the county council and explained why its seven members should vote in favor of a residential sprinkler ordinance. "Tonight you have the opportunity to tell all Anne Arundel County residents that their lives are equally important, rather than a matter of chance based on where they choose to live," Ray told the council. A state-mandated sprinkler ordinance for townhomes and condominiums had been on the books since 1992, but previous efforts in Anne Arundel to pass a similar measure for new one- and two-family homes had failed, largely due to opposition by homebuilders.

This time it stuck. That evening, the council voted 6-1 to adopt the ordinance, which requires sprinklers in all new one- and two-family homes, as well as in new, first-owner mobile homes and in certain renovations. Anne Arundel became the ninth of Maryland's 23 counties to enact such legislation, joining 82 cities and towns in the state that have similar laws.

"We had some opposition again from the homebuilders and real estate people, who said this wasn't a good time for the ordinance because it would add costs to new construction, and because they were already having a hard time selling new homes," Ray told *NFPA Journal* several weeks after the vote. "But I pointed out to them that those

Illustration by Seth

were the same arguments they used back in the 1990s, when the market was booming. It's always the right time to protect lives."

Anne Arundel County exemplifies the goals of "Fire Sprinkler Initiative: Bringing Safety Home," the NFPA advocacy campaign that officially launched in January. The Web-based initiative (www.firesprinklerinitiative.org) will provide materials and resources to people and organizations working for the adoption of requirements for automatic fire sprinklers in new one- and two-family homes. The effort is aimed at adoption on the local, county, and state levels, and can take the form of ordinances or model codes such as NFPA 1, *Fire Code™*, NFPA 101®, *Life Safety Code®*, NFPA 5000®, *Building Construction & Safety Code®*, or the *International Residential Code (IRC)*, all of which include provisions requiring home fire sprinklers in one- and two-family dwellings.

On February 4, NFPA President James Shannon spoke to several hundred attendees at the Residential Fire Sprinkler Summit in Addison, Illinois. About 400 communities across the country have residential sprinklers in use, Shannon told the gathering. "Our goal is to increase that number exponentially over the next few years, and with that broad experience, rebut all of the specious arguments about residential sprinklers, their cost, and their effectiveness that have kept communities and states from adopting residential sprinkler ordinances," he said. "Our opportunity to achieve that common and worthy goal is greater than it has ever been before."

Advocacy successes

As Shannon addressed the Illinois group, a bill supported by the initiative's opposition—chiefly homebuilder and real estate interests—was working its way through the Arizona state legislature. HB 2267 would prohibit communities in the state from passing ordinances requiring sprinklers in new, single-family detached homes. The only communities unaffected would be the handful that already have ordinances in place, including Scottsdale, which has had one since 1986. Despite opposition from more than 30 individuals and groups, including the Arizona League of Cities and Towns, the Arizona Fire Marshals Association, and the Arizona Fire Chiefs Association, the bill won endorsement in committee and was headed to the House floor. Similar anti-sprinkler motions are under consideration in North Dakota, Maine, and elsewhere.

NFPA and its advocacy campaigns are no strangers to adversity. The Coalition for Fire-Safe Cigarettes, launched in 2006 with the goal of passing fire-safe cigarette laws in all 50 states, faced a powerful foe in the well-funded, politically connected tobacco lobby. Three years later, however, 37 states have either implemented the law or passed legislation paving the way for a law, and nine more have legislation pending.

www.firesprinklerinitiative.org

THE INITIATIVE'S WEBSITE OFFERS one-stop shopping to help you learn about the home fire sprinkler issue, keep you up-to-date, help you become an advocate, and connect you with other home fire sprinkler supporters. Here's a primer:

+ A **step-by-step guide** to help you prepare, present, and mobilize your advocacy efforts.
+ **Tips** on how to become an effective community leader and how to build your own grassroots coalition.
+ **Downloadable fact sheets**, designed for distribution, about residential sprinklers. Also on the page is a link to the latest cost-assessment report.
+ **Form letters** you can use to communicate with government and other community leaders on the life-saving benefits and costs of home fire sprinklers.
+ **Model language** to prepare you for questions regarding how your municipal code should be modified, including language describing the specific codes and standards that apply. This page also gives you a downloadable copy of a model ordinance.
+ A reproducible **"myths vs. facts" sheet** on home fire sprinklers.
+ A **downloadable sample petition** seeking sprinkler support.
+ **Links to YouTube videos** supporting the need for home fire sprinklers, created by Common Voices, a fire safety coalition.
+ A **downloadable copy of NFPA's *U.S. Experience with Sprinklers,*** a comprehensive report that will help you back up claims of sprinkler benefits with hard data drawn from extensive research.
+ **Updates on anti-sprinkler legislation** around the country and what you can do to fight them.
+ A **newsfeed** that provides links to relevant news stories including fires, advocacy efforts, and related events. There is also a link to a page describing how sprinklers work.
+ **Links** to other organizations that support home fire sprinklers and that are sources of additional support.
+ An **interactive blog** on home fires.

Questions? Email us at firesprinklerinitiative@nfpa.org.

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Education First

The Home Fire Sprinkler Coalition continues its educational mission. By Gary Keith

WITH NFPA'S INTRODUCTION of the "Fire Sprinkler Initiative: Bringing Safety Home," it's important that the fire service and fire safety advocates understand the role that the Home Fire Sprinkler Coalition (HFSC) plays in protecting a growing number of homes with home fire sprinkler systems.

HFSC, founded in 1996, is the only national, nonprofit organization that works exclusively to educate the public about the life-saving value of fire sprinkler systems in one- and two-family homes. While HFSC has established itself as an important resource for information and educational material, HFSC is not involved in lobbying or efforts to promote fire sprinkler ordinances. It provides the tools and field resources to help sprinkler advocates talk to local elected officials and other decision makers.

HFSC has developed targeted teaching tools that address the informational needs of virtually everyone in the community, including consumers, members of the homebuilding industry, insurance and real estate professionals, school children, building officials, and water purveyors. Our ideas have earned FEMA Fire Prevention & Safety Grant funding, which allows us to share our diverse library of resources.

Shortly after HFSC was established, we were fortunate to acquire Ron Hazelton as our spokesperson. Recognized for his role as Home Improvement Editor for ABC's "Good Morning America," Ron appears in all of our educational videos, including our new "Fire and Sprinkler Burn Demonstration" video, part of a kit that shows fire departments how to build and prepare a dramatic side-by-side fire and sprinkler demonstration.

Recently, more than 1,000 fire departments signed up for our new "Built for Life Fire Department Program," which provides free information and materials to make home fire sprinkler education a focus of their educational outreach.

I have been honored to serve with HFSC from its beginning, and I am very proud of the entire HFSC team. Over the years, our important messages have reached millions through education, public relations, advertising, trade shows and conventions, and our website, www.HomeFireSprinkler.org. If your fire department or organization has not yet tapped into HFSC's resources, you're missing out on an opportunity to improve your community's understanding of the life-saving value of home fire sprinklers.

—Gary Keith is vice-president of Field Operations and Education at NFPA and chair of the HFSC Board of Directors.

With the fire-safe cigarettes effort underway, NFPA in 2007 began a series of focus groups with the fire service, sessions designed to identify other issues requiring a coordinated effort to reduce home fire fatalities and injuries. Overwhelmingly, participants said they wanted to see NFPA back a home fire sprinkler initiative. The idea made sense; NFPA had been a founding member of the Home Fire Sprinkler Coalition a decade earlier, and related NFPA model codes had included home sprinkler provisions since 2006. In addition, a growing number of communities across the country were considering, and in many cases passing, sprinkler ordinances of their own. Last September, the International Code Council voted to require sprinklers in new one- and two-family dwellings, effective 2011, in the IRC, a move supported by NFPA. The following month, NFPA announced it would "coordinate a campaign to increase the number of homes protected by sprinklers."

ON THE WEB

For a brief history of the development of sprinklers, including pioneering efforts dating back to the early 19th century, see www.nfpajournal.org.

"The inclusion of a home sprinkler requirement for new construction in all the model codes strengthens our advocacy position," says Lorraine Carli, vice-president for Communications at NFPA. "We have been very clear that our efforts to move this initiative forward include advocating for the adoption of any code, including the IRC, that contains a sprinkler provision."

The initiative is "exactly what's needed," says Cathleen Vitale, the Anne Arundel County council member who introduced the sprinkler bill that was adopted in January. "Education is a huge part of what these efforts are about," says Vitale. "The ability to have that information in a central location is a vital tool in the legislative process."

Getting it done

The case for home fire sprinklers is timely and compelling and supported by an array of NFPA research. Around 80 percent of fire deaths in the United States occur in the home, killing nearly 3,000 people every year. Sprinklers have been used for more than a century to protect commercial, industrial, and public buildings, and have proven

highly effective in multifamily dwellings. NFPA has no record of a multiple fatality in a fully sprinklered building where the system operated. The risk of dying in a home where a fire is reported decreases by about 82 percent when sprinklers are present. The cost of installing a sprinkler system in a new construction averages $1.61 per square foot.

Vitale remembers the exact moment she decided to fight for home fire sprinklers in Anne Arundel County. Her husband, Mark, a local firefighter, had come home following a shift that included battling a house fire that claimed the lives of two children. Outside the children's room, he told her, a smoke detector sat upside down on a shelf. There were no batteries in it. "He just sat there hugging our little boy, saying 'they didn't have a chance,'" she recalls.

Vitale, an attorney who describes herself as a "staunch Republican," began researching home fire sprinklers. She talked to the local fire service, to homebuilders and real estate representatives, and to other communities that had passed ordinances. She met with local public works officials to make sure water-supply issues were addressed. She was clear about her intentions with fellow council members, and she made sure the community at large knew about her sprinkler effort. It took her "several years" to research the issue and craft a bill, Vitale says, but her due diligence paid off. The bill was introduced last October—timing it with NFPA's Fire Prevention Week was deliberate, she says—and it passed three months later with no major amendments. Homebuilder opposition was minimal, she says. "They spoke in terms of economics, saying now's not the time, but I attributed their absence to being somewhat supportive of what we were trying to do," she says. "They can pack our council room with 300 people if they oppose something."

Vitale, Chief Ray, and others readily share tips and strategy with sprinkler advocates; their suggestions, and much more, are available at www.firesprinklerinitiative.com. For the fire service, says Ray, get your own house in order first; make sure the volunteer service and the union are behind the effort. Use local stories of home fire injuries or deaths to illustrate that every new sprinklered home is an opportunity to avoid stories such as these in the future. Know what the research says about how new, lightweight construction burns. "[New] homes burn faster, produce more heat and deadly smoke, and collapse more rapidly than at any time in our history," Ray told the council in November. "Modern construction methods and materials should be matched with modern fire protection systems."

On the legislative side, Vitale says, make sure you have the support of a county executive or mayor. Take your advocacy message directly to the community, and share burn research on old construction vs. new with homebuilders and real estate representatives. Seek out existing sprinkler legislation—such as that available on the sprinkler initiative website—to modify for use in your own community. "Know that you're not in this alone," urges Vitale. "For every point your opponents raise, you can have a counterpoint that supports the idea that sprinklers should be done in new construction without a second thought. And all of that information is out there."

The case for home fire sprinklers is timely and compelling. Around 80 percent of fire deaths in the United States occur in the home. The risk of dying in a home where a fire is reported decreases by about 82 percent when sprinklers are present.

Mike Chapman, a homebuilder in New Mexico, urges advocates to consider negotiating trade-offs if a community requires residential sprinklers. "You're getting the benefit of safer houses, so you can look at things like road widths, water requirements, and other infrastructure needs [as areas to save money]," he says. "If you can link sprinklers to a reduction of city expenditures, these kinds of efforts could be very successful."

It doesn't matter how you do it, Vitale says—just get it done. "We require sprinklers to protect everything else, so why not the same for one- and two-family homes?" she asks. "Building a home is more than selecting a grade of carpet, or deciding if you want solid cherry cabinets. Sprinklers are common sense."

SCOTT SUTHERLAND *is executive editor of* NFPA Journal.

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Fire-safe Cigarettes: Keep Fighting

As we launch a new advocacy campaign around home fire sprinklers, it is important to note that one of the most gratifying projects undertaken in recent years by the NFPA community is our highly successful coordination of the fire-safe cigarette campaign.

The campaign has progressed far more quickly than any of us could have imagined when we began three years ago. Our goal was to get all of the states to adopt legislation requiring that all cigarettes sold in the state be manufactured to fire-safe specifications. We chose the difficult route of seeking 50 state adoptions after decades of trying to get Congress to adopt a national bill, only to be trumped again and again by the powerful tobacco lobby in Washington.

With the enthusiastic support of the fire service, public health, consumer, and other safety advocates, this issue took off across the country. NFPA coordinated the campaign and provided legislative language, educational materials, public relations, and other support for this effort through a coalition that we organized.

The potential to save hundreds of lives and hundreds of millions of dollars annually in property losses inspired people all over the country to get behind this initiative. That effort created a juggernaut.

Less than three years after the announcement of the Coalition for Fire-Safe Cigarettes, 38 states have passed the legislation applying the fire-safe standard to all cigarette sales. The second-biggest cigarette manufacturer, R. J. Reynolds, has announced that all of its cigarettes in the United States will meet the standard by the end of 2009. Philip Morris, while not willing to go that far, is supporting our efforts to change the law state-by-state. There has also been tremendous movement internationally. Canada was an early adopter of fire-safe cigarette requirements, and now Australia and the European Union have taken action.

It is vitally important that we not let up on this campaign. Our goal of having a true national standard is in sight. But unless we get the job done in the next couple of years, we run the risk that states will, over time, succumb to the pressure to backslide on this advance. If that happens, we will lose this chance for permanent progress. If we reach the point where every cigarette sold in the United States meets the safer standard, however, there will be no turning back.

In a few years, after the laws of all of the states have been changed and taken effect, we expect to see both a significant drop in fire deaths and a measurable decline in property losses. Smoking-related fires are still the number-one cause of fire fatalities in the United States, accounting for between 700 and 900 of the 3,000 or more fire deaths every year, so this is a historic opportunity to move the country in a significant way toward fire safety. But the job isn't done yet.

As I write this, a dozen states—Alabama, Arkansas, Michigan, Mississippi, Missouri, Nebraska, Nevada, New Mexico, North and South Dakota, West Virginia, and Wyoming—still have not passed fire-safe cigarette legislation. If you live in one of those states, please get involved now. Take a look at the Coalition's website—www.firesafecigarettes.org—and contact your legislator with the compelling argument for your state to pass this law without further delay. We have gotten this far because so many people all over the country mobilized to pass legislation where they live. Now we have to complete the job.

PHOTOGRAPH BY DAVE YOUNT/NFPA

Commonwealth Chief

Fire-Safe Cigarette Law to be looked at by Virginia Legislator's

By: Bill Smith

Fast Facts...

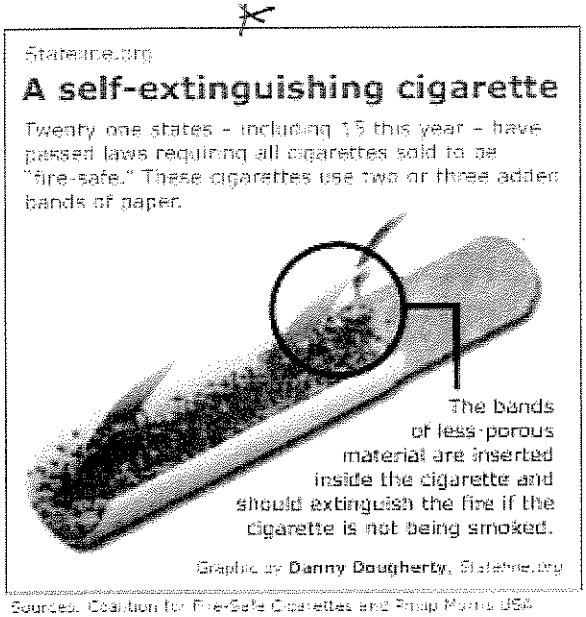
FACT:	Cigarettes are the **leading cause of home fire fatalities** in the United States, killing 700 to 900 people - smokers and nonsmokers alike - per year.
FACT:	Smoking-material structure fires killed 760 people and injured 1,520 others in 2003.
FACT:	Property losses from smoking-material fires total hundreds of millions of dollars each year.
FACT:	There were 25,600 smoking-material structure fires in the United States in 2003.
FACT:	Fires caused by smoking materials are actually on the decline, thanks in part to more stringent standards for fire-resistive mattresses and upholstered furniture, public education, and a dramatic decrease in the number of cigarettes consumed per adult in the United States.
FACT:	The risk of dying in a home structure fire caused by smoking materials rises with age. Between 1999 and 2003, two-fifths (38%) of fatal smoking-material fire victims were age 65 or older.
FACT:	One-quarter of victims of smoking-material fire fatalities are not the smokers whose cigarettes started the fire: 34 percent are children of the smokers; 25 percent are neighbors or friends; 14 percent are spouses or partners; and 13 percent are parents.
FACT:	NFPA research in the mid-1980s predicted that fire-safe cigarettes would eliminate three out of four cigarette fire deaths. If cigarette manufacturers had begun producing only fire-safe cigarettes then, an estimated 15,000 lives could have been saved by now.
FACT:	Mattresses and bedding, upholstered furniture, and trash are the items most commonly ignited in smoking-material home fires.
FACT:	Between 1999 and 2003, almost half (43%) of fatal home smoking-material fire victims were sleeping when injured; one-third (32%) were attempting to escape, to fight the fire, or to rescue others.

Source: NFPA's Fire Analysis and Research Division, Updated: 8/06

Cigarettes sold in 21 states will be self-extinguishing after a strikingly high 15 states passed new laws this year to combat smoking-related blazes, the No. 1 cause of home-fire deaths.

A fire-safe cigarette has a reduced propensity to burn when left unattended. The most common fire-safe technology used by cigarette manufacturers is to wrap cigarettes with two or three thin bands of less-porous paper that act as "speed bumps" to slow down a burning cigarette. If a fire-safe cigarette is left unattended, the burning tobacco will reach one of these speed bumps and self-extinguish.

In 2006, at the urging of Chief Mary Beth Michos and Chief Kevin McGee of the Prince William County Fire & Rescue Department, the Virginia Fire Chiefs Association joined with the Coalition for Fire Safe Cigarettes and other groups interested in promoting the adoption of fire-safe cigarettes. The goal was to have fire-safe cigarette legislation adopted in Virginia in an effort to reduce deaths and injuries caused by smoking materials.



During two Virginia Fire Service Stakeholders Legislative Summit's held in 2007, support was garnered to draft and find sponsorship for legislation to make fire-safe cigarettes a reality in Virginia during the upcoming General Assembly session. Since those summits, support has been sought and obtained from Phillip Morris and R. J. Reynolds Tobacco Companies in addition to the stakeholder groups.

It is important to understand what this law is and what it is not. This is not a law about an individual's right to smoke or where an individual can smoke. This law enhances the safety of cigarettes because they are a source of fires and it can be viewed as an enhancement to product safety much along the same lines as requiring airbags in automobiles.

Currently, five states have safe cigarette laws in effect and 16 others have passed similar laws and are approaching their effective dates. An estimated 52% of the population of the United States is protected by safe cigarette laws.

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FEMA

March 28, 2008

USFA Position Paper – Residential Fire Sprinklers

In the year 2006, 19% of all reported fires occurred in one- and two-family structures; however, these fires caused 66% (2,155) of the fire deaths in the US[1]. In addition, more than 25% of firefighter on-duty deaths are associated with residential fires[2]. This means that approximately 25 firefighter deaths occur during responses to residential fires each year, since on average, there are about 100 on-duty firefighter deaths annually[3]. Despite the fact that these figures represent improvement over the last 30 years, they continue to be appalling. Such losses are unacceptable.

Since the 1970's, USFA has promoted research studies, development, testing, and demonstrations of residential fire sprinkler systems and smoke alarms. These efforts, in concert with heroic efforts by many organizations and individuals, have resulted in the adoption of requirements to install smoke alarms in all new residential construction. In many jurisdictions, the retrofit of smoke alarms into existing residential occupancies has been mandated. Together, these efforts have saved many lives.

The results have been different, however, with respect to residential fire sprinkler systems; only a few jurisdictions have mandated their installation in new construction, and none have mandated retrofit of existing one and two family housing stock. The Center for Fire Research at the National Institute of Standards and Technology has studied the impact of both smoke alarms and sprinklers in residential occupancies[4,5], and estimates that:

1. When fire sprinklers alone are installed in a residence, the chances of dying in a fire are reduced by 69%, when compared to a residence without sprinklers.
2. When smoke alarms alone are installed in a residence, a reduction in the death rate of 63% can be expected, when compared to a residence without smoke alarms.
3. When both smoke alarms and fire sprinklers are present in a home, the risk of dying in a fire is reduced by 82%, when compared to a residence without either.

Much has been written about the reduction of residential fire deaths due to improvements in building codes and the installation of smoke alarms. Without a doubt, these have had a substantial impact on the home fire problem. The annual number of fire deaths in residential occupancies continues to decline. The trend in fire death data, however, shows that the number of residential fire deaths is declining at a slower rate over the past 10 years than it did in the period 1977 through 1995.

Full-scale fire tests in residential settings suggest an explanation for this slowing in the rate of decline in residential fire deaths. The available time to escape a flaming fire in a home has decreased significantly (*i.e.*, from 17± 6 minutes in 1975 to 3± ½ minute in 2003)[6]. This decrease in time to escape has been attributed to the difference in fire growth rates of the representative samples of home furnishings used in the two studies[6]. In short, it appears that a fire involving modern furnishings grows faster than a fire involving older furnishings. The practical impact of this finding is clear – smoke alarms alone may not provide a warning in time for occupants to escape a home fire.

2007 Virginia Fire Incident Reporting System (VFIRS) Quick Facts[1]

As of 01/09/2008

- **Somewhere in Virginia, every minute, a fire department responded to an incident** – Fire departments responded to an average of 1,238 incidents each day. There were on average 777 EMS responses, 73 fire responses, and 387 other responses each day.

- **The demand for the fire service has expanded; the fire service does more than put out fires** – Sixty-three (63) percent of the incidents were emergency medical or rescue calls; 9% were good intent calls; 8% were non-malicious false calls, 7% were service calls, 6% were fire calls, 5% were hazardous condition calls, and 2% were other calls.

- **Fire injuries and fire deaths happen more than you might expect** – On an average, every 5 hours, 14 minutes someone was hurt or died as a result of fire; 558 fire injuries or deaths were reported in 2007.

- **Fire damage to property can be costly** – Total fire dollar loss was $434.5 Million; 414 incidents had a total dollar loss of $50,000 or more.

- **Rescue Calls** - Forty (40) percent of EMS incidents occurred in a 1-or-2 family dwelling home, 17% occurred on highways, streets, road or parking areas, and 6% occurred in nursing homes.

- **Cooking** - For residential structure fires in which the cause was known, 38% of the fires were due to cooking and accounted for 44% of the civilian injuries.

- **Smoking** accounted for 17% of civilian deaths in residential structure fires in which the cause was known.

- **Grass, Brush Fires** – Thirty-three (33) percent or one-third of the total fires reported in 2007 were natural vegetation fires while structure fires accounted for 29%.

- **Even though deliberately set fires or suspicious fires account for a low percentage of residential structure fires, the effects are devastating** – Incendiary or suspicious fires contributed to 61% of total dollar loss in residential structure fires when cause was known – $87.7 Million in 2007 and 52% of civilian deaths.

[1] Totals for Calendar Year 2007 will not be finalized until April 1, 2008. For questions about VFIRS, call Marion A. Long, VFIRS Program Manager, (804) 371-0220.

903.2.1.2 Group A-2. An automatic sprinkler system shall be provided for Group A-2 occupancies where one of the following conditions exists:

1. The fire area exceeds 5,000 square feet (465 m^2);
2. The fire area has an occupant load of 100 or more in night clubs or 300 or more in other Group A-2 occupancies; or
3. The fire area is located on a floor other than the level of exit discharge.

Change Item 2 of Section 903.2.1.3 of the IBC to read:

2. In Group A-3 occupancies other than churches, the fire area has an occupant load of 300 or more.

Change Section 903.2.7 of the IBC to read:

903.2.7 Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area, except in the following R-2 occupancies when the necessary water pressure or volume, or both, for the system is not available:

Exceptions:

1. Buildings which do not exceed two stories, including basements which are not considered as a story above grade, and with a maximum of 16 dwelling units per fire area. Each dwelling unit shall have at least one door opening to an exterior exit access that leads directly to the exits required to serve that dwelling unit.
2. Buildings where all dwelling units are not more than two stories above the lowest level of exit discharge and not more than one story below the highest level of exit discharge of exits serving the dwelling unit and a two-hour fire barrier is provided between each pair of dwelling units. Each bedroom of a dormitory or boarding house shall be considered a dwelling unit under this exception.

Add Section 903.3.1.2.2 to the IBC to read:

903.3.1.2.2 Attics. Sprinkler protection shall be provided for attics in buildings of Type III, IV or V construction in Group R-2 occupancies that are designed, or developed and marketed to senior citizens, 55 years of age or older and in Group I-1 occupancies in accordance with Section 6.7.2 of NFPA 13R.

Change Section 903.4.2 of the IBC to read:

903.4.2 Alarms. Approved audible devices shall be connected to every automatic sprinkler system. Such sprinkler water-flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Alarm devices shall be provided on the exterior of the building in an approved location. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system. Group R-2 occupancies that contain 16 or more dwelling units or sleeping units; or any dwelling unit or sleeping unit two or more stories above the lowest level of exit discharge; or any dwelling unit or sleeping unit more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit, shall provide a manual fire alarm box at an approved location to activate the suppression system alarm.

Add an exception to Section 905.2 of the IBC to read:

Exception: The residual pressure of 100 psi for 2½ inch hose connection and 65 psi for 1½ inch hose connection is not required in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and where the highest floor level is not more than 150 feet above the lowest level of fire department vehicle access.

Change Section 906.1 of the IBC to read: