Florida
Fire Sprinkler
Association, Inc.

April 22, 1993

Mr. Steve Tribble, Director
Division of Records and Reporting
Florida Public Service Commission
101 East Gaines Street
Tallahassee, Florida 32399

Dear Mr. Tribble:

Please accept this letter as a written request for hearing on proposed Administrative Rule 25-30.465, Docket Number 911082-WS. We represent the Florida Fire Sprinkler Industry which is impacted by the proposed Rule.

Subsequent to this letter, we supplied the Commission with *A Report Presenting An Amendment To Proposed Rule 25-30.465 of the Public Service Commission.* On March 3, 1993, the Florida Cities Water Company presented comments in opposition to our proposal. We then provided a *Response to Opposition Comments* ... to the Commission. These three documents excluding this letter are the only documents we know exists that addresses this issue other than the Proposed Rule. Please notice us if any documents have been filed on Rule 25-30.465 so we may respond appropriately.

We have addressed this issue during the recent legislative session. The bill passed the Senate, but time ran out before the House of Representatives could respond. We have asked Governor Chiles to include this issue in the expected call for a Special Session of the Florida Legislature, a copy of our letter attached.

The proposed Rule 25-30.465 is viewed by us as discriminatory. Other provisions of the proposed Rule require all ratepayers to contribute to the cost of providing fire flow demands. This is fair. However, the provisions of 25-30.465 go too far. The ratepayer who takes action to reduce the needed fire flow is taxed the base rate plus an additional monthly fee while the ratepayer who creates the demand is simply charged the base rate.

During a workshop conducted by the Commission on the proposed Rule, more detailed information was requested on the water savings capabilities of fire sprinkler systems. Enclosed herewith is that information. If the Commission desire additional information, please feel free to contact us.

We expect many out-of-town speakers to attend the hearing. We expect representatives from the Florida Fire Chief's Association, the Florida State
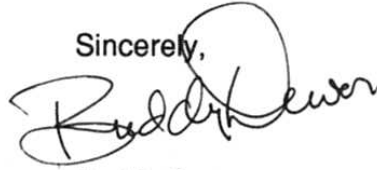
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Firemen's Association, the Florida Fire Marshal's Association, as well as representatives from lodging and health care interest groups to testify in support of our proposal. A specific time and date to hear our concerns would be greatly appreciated.

Thank you for your continued cooperation.

Sincerely,

Buddy Dewar
Executive Director

A Comparison of Fire Flow Needs
Fire Sprinklers and Non-sprinklered Properties.

There are a number of fire flow formulas developed and used within the country. The needed fire flow formulas developed and established by the Insurance Services Office (ISO) are used extensively in Florida because of its tie to insurance rates. Also used is the Kimball rate-of-flow formula because of its widespread acceptance by the fire service community, mainly because of its simple calculations. Communities that impose a demand for fire flow on private waterworks companies generally use one of these two formulas when determining fire flow demands in a response zone.

Insurance Services Office Formula.

The Insurance Services Office publishes a formula which is different in many ways from long standing fire flow formulas. Fire flow formulas originally addressed only the size of the building. The ISO formula also considered the type of construction, building use or contents being stored, and exposure to other buildings.

This formula is:

$$Q = (C) (O) (X+P)$$

$$C = 18 \, F \, (A)^{0.5}$$

F = 1.5 for Construction Class 1 - Wood Frame
= 1.0 for CC2 - Joist/Masonry
= 0.8 for CC3 and CC4 - Noncombustible/Masonry
= 0.6 for CC5 and CC6 - Modified Fire Resistive/Fire Resistive

A = Effective Area - Largest Floor + 50% of other floors

O = 0.75 - C1 - Noncombustible Contents
= 0.85 - C2 - Limited Noncombustible Contents
= 1.00 - C3 - Combustible Contents
= 1.15 - C4 - Free -burning (Paper storage - wood shops)
= 1.25 - C5 - Rapid Burning

X = Exposure Factor based on wall construction characteristics.

P = Communication Factor depending on openings in exposure walls.

The Kimball Formula

In the early 1950's, Iowa State University developed a rate-of-flow formula. The shortcoming of the ISU formula was that it only took into consideration building size. Warren Kimball, in his book *Fire Attack 1*, argues that first arriving fire companies cannot put into service adequate amounts of water to fight involved structural fires. In the time it takes for additional fire forces to arrive and setup, the fire grows in intensity and the total heat release requiring more water to absorb the heat and suppress the fire. He modified the ISU formula as:

$$Q = V \times 4/100 \text{ where,}$$

Q = Fire Flow in Gallons Per Minute, and

V = Volume of Building in Cubic Feet.

Many in the fire service use the Kimball formula because it is very easy to compute and it establishes a safety factor for delayed fire apparatus response. The Kimball formula assumes that the fire has intensified beyond the fire flow capabilities of the first arriving fire suppression units. As a result, the fire suppression tactic is to setup for larger hoses and for a longer duration. In central cities areas where the second responding units are delayed to a very minimal degree, Kimball recommends the consideration of 3/100 instead of 4/100 in the formula, particularly if exposure hazards do not exist.

The Effect of Fire Sprinklers on Fire Flow

All of the methods of calculating and estimating fire flow discussed herein are for buildings and structures *not* equipped with automatic fire sprinkler systems. For buildings equipped with a fire sprinkler system, the fire flow demand is that identified during the design of the fire sprinkler system. Fire sprinkler fire flow demands are **always** lower than the fire flow demands of an identical non-sprinklered building. Fire flow calculations were developed for a number of different types of buildings using both the Kimball and the ISO formulas. Then, the provisions of the fire sprinkler codes were used to calculated the fire flow demands should the building be equipped with a fire sprinkler system. Part of the fire sprinkler requirement includes a hose stream allowance. This is for the sometimes required 1-1/2 inch fire hose connection for use by fire departments or building occupants. Some larger hazardous buildings may be required to install 2-1/2 fire department connections. In fire department operations, firefighter seek these outlets close to the base of the fire so they do not have to drag hose throughout a building. The common use of these connections is for very low volumes of water to extinguish any fire that may not have been extinguished by the fire sprinkler system.

Example 1:

A three story wood frame garden apartment, 4,000 sq ft per story, 8 ft ceilings with no exposures.

Without fire sprinklers:

Kimball Formula - V=96,000. Q=96,000 x 4/100 = **3,840 gpm**

In quick response zone - Q=96,000 x 3/100 = **2,880 gpm**

ISO Formula $Q=(C)(O)(X+P)$
$$C=18F(A)^{0.5} = 18(1.5)(8000)^{0.5} = 2,415$$
$$O=1.0$$
$$(X+P)=1.0$$
$$Q+(2415)(1.0)(1.0) = \textbf{2,415 gpm}$$

With fire sprinklers:

Residential Sprinklers:

(NFPA 13R)
4 sprinklers - total 62 gpm + 100 (hose stream) = **162 gpm**

(NFPA 13 Area Density)
180 + 100 (hose stream) = **280 gpm**

Percent reduction in demand of fire flow as a result of installing a fire sprinkler system in example 1:

ISO Non-sprinklered Fire Flow	2,415 gpm
NFPA 13 R Fire Flow	162 gpm
Percent Reduction	**93.29%**

Example 2:

A 200,000 square foot warehouse of fire resistive construction with 30 foot ceilings storing Group A plastic commodities with no exposures.

Without fire sprinklers:

Kimball Formula:
Q=200,000 x 30 x 4/100 = **240,000 gpm**
Q=200,000 x 30 x 3/100 = **180,000 gpm**

This example clearly shows the shortcomings of the Kimball Formulas. Although the Kimball formula is very easy to use, its use in larger commercial structures consistently projects figures that are above reasonable fire flow demands. We chose to use the ISO formulas in are comparisons between fire sprinklered and non-sprinklered buildings because of the shortcomings of the Kimball formula's.

ISO Formula:
$Q=(C)(O)(X+P)$
$C=18 \, (0.6) \, (200,00)^{0.5} = 4,830$
$O=1.25$
$(X+P)=1.0$
$Q=4830 \times 1.25 \times 1.0 = $ **6,037 gpm**
$Q=$**6,000 gpm** is maximum allowable in this type of building

With fire sprinklers:

NFPA 231 - 3,900 + 500 (hose stream) = **4400 gpm**
NFPA 231C - 720 + 380 (in-rack sprinklers) + 500 (hose stream) = **1600 gpm**
ESFR Sprinklers (NFPA 231 or 231C) - 1450 + 250 (hose stream) = **1700 gpm**

In this scenario, three different fire sprinkler designs can occur within the parameters of acceptable fire sprinkler design standards. Fire sprinkler systems are generally installed at the lowest flow rates because it is the least cost system.

Percent reduction in fire flow demand as a result of installing a fire sprinkler system in Example 2:

ISO Non-sprinklered Fire Flow	6,000 gpm
NFPA 231C Fire Flow	1,600 gpm
Percent Reduction	**73.33%**

Example 3:

A 15 story office building of fire resistive construction with 20,000 square feet per floor and 8 foot ceilings with no exposures.

Without fire sprinklers:

Kimball - Q=20,000 x 8 x 4/100 = **6,400 gpm**
Q=20,000 x 8 x 3/100 = **4,800 gpm**

ISO - Q=(C)(O)(X+P)
$C=18\ F(a)^{0.5}= 18\ (0.6)\ (160,000)^{0.5} = 4320$
O=1.0
(X+P)=1.0

Q=(4320) (1.0) (1.0) = **4,320 gpm**

With fire sprinklers:

NFPA 13 - 180 + 100 (hose stream) = **280 gpm**

Percent reduction in demand for fire flow as a result of installing a fire sprinkler system in example 3:

ISO Non-sprinklered Fire Flow	4,320 gpm
NFPA 13 Fire Flow	280 gpm
Percent Reduction	**93.52%**

The demand for fire flow as a result of installing a fire sprinkler system is substantial reduced as demonstrated by these examples. These examples also suggest a need for the establishment of specific criteria for identifying fire flows within a community. Should the Public Service Commission specify which fire flow formulas should be used by government when they determine the fire flow needs of a community?

The *real world* or actual fire suppression experience must also be considered. Fire intensity increases at an exponential rate. The fire sprinkler system activates when the ceiling temperature reaches typically 165° and either extinguishes the fire or controls the fire until the fire department arrives. The fire in the non-sprinklered building continues to grow as the fire department is responding, often the fire is beyond control of the first responding fire suppression crews who then must change its tactics to control the fire from spreading to other buildings.

Flow rates of water through fire department hose should also be considered.

1-1/2 spray nozzle - 70-150 gpm
1-3/4 spray nozzle - 90-185 gpm
2-1/2 spray nozzle - 200-300gpm
Aerial Tower Spray Nozzles - 750 gpm+

It is significant to note that the ISO fire flow formulas very closely parallel the actual demands for water needed for a fully involved structure fire. The fire service normally determine its capability of delivering water at the fire flow capacity when determining fire station manning and equipment levels. One can quickly see how communities with progressive fire sprinkler ordinances have been able to control the cost of delivering fire suppression forces.

Florida
Fire Sprinkler
Association, Inc.

April 6, 1993

The Honorable Lawton Chiles, Governor
State of Florida
The Capitol
Tallahassee, Florida 32301

Dear Governor Chiles:

We respectfully request your consideration to include a consumer interest issue in your expected call of a Special Session of the Legislature. Waterworks companies are beginning to impose fees, some over $100 per month, for water *standing* in fire sprinkler systems. This discriminatory *standby fee* is the subject of a proposed Rule being considered by the Public Service Commission.

Senate Bill 1794 successfully passed the Senate during the last hour of the 1993 Session on, Friday, April 2nd. Unfortunately, the House companion bill was not heard although on the calendar. Our request is to address that portion of Senate Bill 1794 that deals with the waterworks companies.

The Public Service Commission will address its proposed Rule 25-30.465, beginning May 24, 1993. It is almost a certainty, if we are not successful in convincing the PSC to correct its proposed Rule, that standby fees will be **mandated** on consumers throughout the State before the 1994 Legislature can react, thus the urgency of this request. We have asked the Office of Public Counsel to assist us in our argument before the PSC. It is significant to note that the PSC regulates private water providers. Thus, a successful result from the Public Service Commission will not resolve standby fees imposed by public waterworks providers.

Waterworks system demands are based upon domestic needs plus needed fire flow. The fire flow demand is usually established by the governmental entity and imposed upon the private waterworks provider. When establishing the fire flow demand, government generally uses the needed fire flow requirements established by the Insurance Services Office (ISO), that entity that rates communities for insurance purposes. The ISO formulas are based upon buildings that are *not* equipped with a fire sprinkler system. The water demands for fire sprinklered buildings are always significantly less than the demands created by non-sprinklered building.

For an example, consider a three story wood frame adult congregate living facility, 4,000 square foot per story, 8 foot ceilings, with no adjacent buildings. The needed fire flow without fire sprinklers using the ISO formula would be 2,415gpm. Thus, a community which would allow the construction of a non-sprinklered building of this type would be imposing a 2,415gpm demand on the waterworks system. If this same building was equipped with an automatic fire sprinkler system, the fire sprinkler system water demand would be only 162gpm.
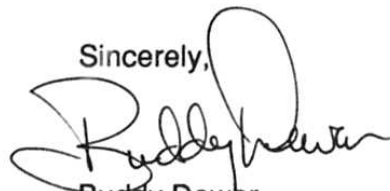
The entire community is paying for the demands on the waterworks system, both domestic plus fire flow, through their monthly rate. Using the above example, the addition of an automatic fire sprinkler system reduces the fire flow demand for this building from 2,415gpm to 162gpm, or a reduction by over 93%. In this example, the consumer, who is already paying for the fire flow demand created by the non-sprinklered building, is charged a monthly fee for the water standing in the sprinkler piping, even though their actions of installing the fire sprinkler system reduced the fire flow demand for this building by over 93%. Those creating the demand are not taxed while the consumer who takes action to reduce water demand, to reduce the cost of government, to preserve life and property, are penalized by way of discriminatory standby fees.

The Florida Fire Service community is strongly in support of this legislation. The many industries impacted by this standby fee, and in particular health care providers and the lodging industry, are strongly in support of this legislation and actively supported the issue during the recent Legislative Session.

Also significant to note is that the legislative committees that would hear this issue are not those who would hear the correctional and workers' compensation issues expected to be addressed should you call a special session. The Community Affairs Committee would address this issue. We would not wish to detract from the need for our Legislature to address workers' compensation and get a handle on crime.

Thank you for you consideration of our request.

Sincerely,

Buddy Dewar
Executive Director

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Attorneys at Law

a partnership including professional associations

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April 23, 1993

Mr. Steve Tribble, Director   **HAND DELIVERY**
Division of Records and Reporting
Florida Public Service Commission
101 East Gaines Street
Tallahassee, FL 32399-0850

RE: Docket No. 911082-WS
     Proposed Revisions of PSC Water and Wastewater Rules

Dear Mr. Tribble:

Enclosed on behalf of Florida Cities Water Company, for filing in the above docket, are an original and fifteen copies of the following:

04468-93 1. Petition for Leave to Intervene; and

04464-93 2. Comments on Proposed Rules.

Please acknowledge receipt of the foregoing by stamping the enclosed extra copy of this letter and returning same to my attention. Thank you for your assistance.

Sincerely,

Wayne L. Schiefelbein

WLS/meg
cc: (w/enc.)
     All interested persons listed on
     FPSC docket mailing list

ACK
AFA
APP
CAF
CMU
CTR
EAG
LEG
LIN
OPC
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SEC
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