U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC

Swimming Pool Safety Hearing Agenda
Tampa, Florida
Monday, June 21, 2004
10:00 a.m.

Welcoming Remarks

The Honorable Hal Stratton, Chairman, U.S. CPSC
The Honorable Thomas Moore, Commissioner, U.S. CPSC
The Honorable Pam Iorio, Mayor, City of Tampa

Oral Presentations

Panel #1

- The Honorable Debbie Wasserman Schultz, The Florida Senate, Tallahassee, FL
- Jane Parker, Florida Department of Health, Tallahassee, FL
- Terry Lambert, Florida Department of Health, Orlando, FL

Panel #2

- Carvin DiGiovanni, National Spa and Pool Institute, Alexandria, VA (No statement)
- Tom Karst, United Pool and Spa Association, Jacksonville, FL
- Paul Pennington, Vac-Alert Industries, LLC, Ft. Pierce, FL
- David Oxley, Florida Swimming Pool Association, Oldsmar, FL

Panel #3

- Penny Taylor Miller, Deerfield Beach, FL
- Josh de Ibern, Clearwater, FL
- Carole de Ibern, Clearwater, FL
- Michael Haggard, Haggard, Parks, Haggard & Bologna, P.A., Coral Gables, FL (No statement)

Panel #4

- Christopher Bengivengo, Suncoast Safe Kids Coalition and West Central Florida Drowning Prevention Coalition, Dunedin, FL
- Melanie Hall, The Children's Advocacy Center and Greater Tampa Area Safe Kids Coalition, Tampa, FL
- Karen Liller, College of Public Health, University of South Florida, Tampa, FL
- Anna Plotkin and Gerri Penney, Drowning Prevention Coalition of Palm Beach County, West Palm Beach, FL

Panel #5

- John Brown, Safety Solutions, Inc., Jensen Beach, FL
- Alfred Flaherty, Plant City, FL
- Gary Duren, American Society of Mechanical Engineers, Key Stone Heights, FL

Adjourn

Senator Debbie Wasserman Schultz

Pool Safety

Drowning usually occurs quickly and silently. Two minutes following submersion, a child will lose consciousness. Irreversible brain damage occurs after four to six minutes and determines the immediate and long-term survival of a child. Even though the death rate from drowning among children ages 14 and under declined 35 percent from 1987 to 1996, drowning remains the leading cause of unintentional injury-related death among children ages 1 to 4.

The majority of these drowning occur in residential swimming pools. However, children can drown in as little as one inch of water and are therefore at risk of drowning in wading pools, bathtubs, buckets, diaper pails, toilets, spas and hot tubs. In 2001 alone, 859 children ages 1 to 14 died from drowning (CDC 2003). The most frightening part of this is that according to the National Center for Injury Prevention and Control most children who drown in pools were last seen inside the home, had been out of sight for less than five minutes, and were in the care of both parents at the time.

Near-drowning have high case fatality rates. Fifteen percent of children admitted for near-drowning die in the hospital. As many as 20 percent of near-drowning survivors suffer severe, permanent neurological

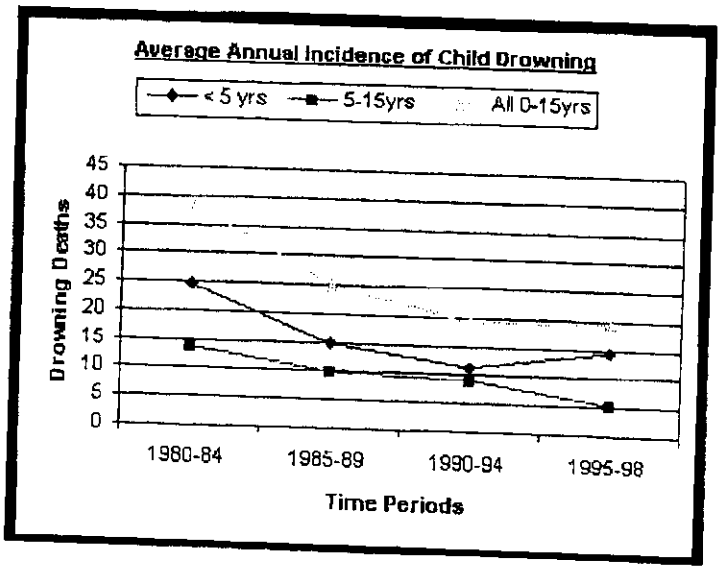
disability. For every child who drowns, an additional four are hospitalized for near-drowning; and for every hospital admission, approximately four children are treated in hospital emergency rooms. A swimming pool is 14 times more likely than a motor vehicle to be involved in the death of a child age 4 and under.

It is for all the reasons I have mentioned, that I decided a few years ago to introduce legislation to require swimming pool safety features. The legislation that passed by the legislature requires new pools and pool which undergo inspection to have a barrier or fence around them. There are strict specifications within this law for the requirements of the barrier. Including but not limited to the material used for the structure, the height of the structure, even how the door opening the barrier should open and how high the latch must be. In order to prevent young children from reaching it. This law also sets specific penalties for anyone who violates it or simply chooses to not comply with the law. It goes as far as allowing the pool inspector to close down the pool.

This past year in the legislature I introduced another piece of legislation which would have put the same requirements on condominiums as the law now requires in residential pools. Unfortunately, my colleagues in the legislature did not see this as a necessary law and it did not pass.

It is for this exact reason that I want to urge all of you today to encourage other states to adopt laws to require pools to be enclosed by some type of barrier. It is also imperative for you to encourage schools to have swimming lessons. Children need to learn what they can in order to not drown. We need more drowning prevention, swim safety educational and promotional efforts around the United States.

I have provided a chart to show you the numbers on drowning rates in the country.



- Up until the 1990 – 94 period, child death by drowning had been steadily decreasing. This steadily decreasing trend is clear for all children, including both the under 5 age group and the 5 to 15 year age group.

- However, over the 1995 -98 time period an increase in drowning rates, particularly for the under 5s, is evident. For the 5 to 15 years age group, drowning have continued to decrease. If the drowning rate for all children, aged 0 – 15, is considered, a slight increase in annual average drowning is evident.

Jane Parker

Oral Presentation
Consumer Products Safety Commission
Swimming Pool Drownings Field Hearing
June 21, 2004

By:
Jane Parker, Planning Manager
Florida Department of Health, Office of Injury Prevention

- Brief overview on the development of drowning prevention public service announcement (PSA)
- Show the PSA to those in attendance
- Brief overview of creative approach to drowning safety in high-risk populations by Palm Beach County SAFE KIDS Coalition
- Brief update on *A Study of Panhandle Gulf Drownings*, June – July 2003

Testimony
Consumer Products Safety Commission
Swimming Pool Drownings Field Hearing
June 21, 2004

By:
Jane Parker, Planning Manager
Florida Department of Health, Office of Injury Prevention

Florida's Childhood Injury Prevention Campaign Overview - Drowning

Drowning is the leading cause of death for Florida's children ages one to four. In fact, during 2002, drowning was the leading cause of death for Florida's children 14 years and under.

The Ounce of Prevention Fund of Florida partnered with the Florida Department of Health, Office of Injury Prevention, and the Florida Department of Children and Families to develop and implement a public awareness campaign in 2004, to reduce the occurrence of injury and death to children under 6 throughout the state caused by drowning. The Ounce of Prevention Fund of Florida, is a private, nonprofit corporation whose mission is to identify, fund, support and evaluate innovative prevention and early intervention programs that improve the health, education and life outcomes of Florida's at-risk children and families

The campaign utilizes four components to reinforce messages delivered to the target audience: public service announcements for radio and television, training for direct service providers who work with families of young children, a Web site with useful links and downloadable documents, and printed brochures.

New research recently released from the National SAFE KIDS Campaign and Johnson & Johnson concludes parents are overconfident about their children's safety and abilities around water and often become distracted by other activities while supervising their children.

While our campaign focuses on adult supervision as the most effective prevention strategy, it also encourages multiple layers of protection, such as correct and consistent use of fencing, pool alarms, door locks or other barriers to protect children from water hazards.

Based on drowning statistics, the public service announcements target parents and caregivers of children ages birth to five, especially those caring for young boys, as boys are more than twice as likely as girls to suffer injury or death from drowning.

Public Service Announcements

The Ounce of Prevention Fund, in conjunction with the Florida Department of Health, Office of Injury Prevention, and the Florida Department of Children and Families, developed television and radio public service announcements using a documentary approach with true life stories from parents, caregivers and rescue workers. Real people share their stories of how a child in their care nearly drowned, focusing on how quickly it happened. The tag line for the PSAs is "Keep your eye on the kids."

The public service announcements are airing statewide on radio and television from April through June 2004, as drowning incidents increase during the months of May through August. The public service announcements are being placed through the Florida Association of Broadcasters (radio and television) and through the Florida Cable Telecommunication Association (television).

Training

The Ounce of Prevention Fund is conducting free injury prevention training sessions for direct service providers such as home visitors for families with young children, parent support group facilitators and child care providers. The training was developed with input from the Florida Department of Health, Office of Injury Prevention. The training objective is to inform direct service staff of potential drowning hazards in and around the home and provide them with prevention strategies to help families create safe environments for their children. Training availability is advertised on the Ounce of Prevention Fund's Web site and through the TEAM Florida network. The TEAM Florida Partnership is a state level planning, technical assistance and policy support workgroup made up of representatives from child serving agencies, organizations and programs, advocates, consumers, legislative staff, Governor's staff and community facilitators from each district.

During the training, safety products donated by local Lowe's stores, such as safety gates, self-latching gate locks, pool alarms and toilet locking clips are demonstrated by the trainer and then provided to participants as door prizes. Participants also help develop a home safety checklist tailored to the specific issues their families face and the checklist is then provided to all participants.

Approximately 200 workers will receive the injury prevention training during May and June of 2004.

Web Site

The Ounce of Prevention Fund has dedicated a portion of its existing Web site, www.ounce.org, to injury prevention. Parents and professionals visiting the site can learn how to prevent common childhood injuries and links are provided to additional on-line parenting and injury prevention resources. The public service announcements and brochures developed for this campaign are also available on the Web site. From March 1 through April 30, 2004, the Web site had approximately 3,000 visitors.

Printed Materials

The Ounce of Prevention Fund, with input from the Florida Department of Health, Office of Injury Prevention, developed and printed 10,000 copies of a brochure on drowning prevention targeting parents and caregivers of children ages birth to five. The brochures are being distributed to each of Florida's 67 county health departments and to 2-1-1 Big Bend, which houses the statewide Parent HelpLine. The brochure is also being translated into Spanish and Creole and will be made available for download from the Web site.

Anti-Entrapment Provisions of Collector Tanks in Florida Commercial / Public Swimming Pools

Terry Lambert, M.S.E., E.I. and Robert Foster, P.E., Regional Engineers, Florida Dept. of Health, March 2004

Collector tanks are mandated in Florida's state health code to help prevent the possibility of, and hazards associated with, body part entrapment on outlet fittings in public bathing facilities (swimming pools, wading pools and spas). Hazards include hair entanglement, appendage entrapment, evisceration, disembowelment, near drowning submersion incidents and accidental drowning. The prophylactic functionality behind collector tank engineering is to provide an alternate protected basin, the collector tank, open to atmospheric pressure from which recirculation / filtration and feature pumps will draw water, thus removing direct suction fittings from the pool shell (except for a vacuum port which should be covered with a flush plug when not in use). In such a system water from the pool travels by gravity from the main drain grate through specifically sized piping at reduced flow velocities (3 feet per second maximum) to the collector tank by gravity due to the difference in water levels between the pool shell and the collector tank. If the main drain were cut off by a body in this scenario the pump would be able to keep pumping water from the collector tank. The body would only be exposed to the force and pressure associated with the effective weight of the water column above and would not be exposed to high "suction pressure" or draw that normally exists near the direct suction fitting of a pump. The body would not be entrapped or stuck to the grate because no vacuum or negative pressures are produced in the gravity piping between the pool shell and the collector tank. The nominal forces in play at a properly engineered gravity fed intact main drain grate can reasonably be overcome by normal human agility due in part to the low viscosity of water. The potential for hair entanglement is alleviated via low flow velocity limits through the grating (maximum 1 ½ feet per second).

Direct suction anti-entrapment methodologies utilizing dual or multiple main drains or vent line provisions are susceptible to inherent potential failures. Susceptibilities include accidental blockage, inadequate engineering design, and human negligence. Blockage can occur due to debris collection and accumulation, scum formation and encrustation at the vent line meniscus, and accidental blockage or willful dismantlement due to a lack of operator functional understanding. Poor vent line engineering design, inadequate installation and incorrect pipe or pump sizing can cause the pump to suck air prematurely, prompting dismantlement or circumvention by service personnel. A poorly designed or maintained device may not work as intended providing a false sense of security. One anecdotal case involved a pool operator that placed his chemical measuring cup onto the vent line stand pipe thus sealing off the means for relief.

As a measure of susceptibility to failure the requirement of collector tanks for entrapment prevention can be equated to the requirement for an atmospheric air gap in cross connection contamination control in drinking water and wastewater utility engineering. The anti-entrapment benefits that collector tanks provide are not easily circumvented.

History of Commercial / Public Swimming Pool Code Regulation in Florida

Collector Tanks - Prohibition of Direct Suction

1954-1977	**Collector Tanks Not Required**
1977-1979	**Collector Tanks Required when a vacuum filter is installed**
1979-1993	**Collector Tanks Required for Swimming Pools. Wading Pools with skimmers were exempted. Spas with less than 200 square feet of surface area were exempted, but were required to have a properly sized vent line for each suction line.**
1986-1993	**Allowed vent lines in lieu of collector tank when previously approved direct suction pool was modified.**
1993-now	**Collector Tanks Required on all swimming pools, spas and wading pools.**
2004	**Specifies 2.25 square feet as the minimum collector tank surface area open to the atmosphere.**
	Requires vacuum ports to have spring-loaded safety covers rather than removable flush plugs.

Anti-Entrapment Provisions of Collector Tanks in Florida Public / Commercial Swimming Pools

Terry Lambert, M.S.E., E.I. and
Robert Foster, P.E.,
Regional Engineers,
Florida Dept. of Health
Division of Environmental Health
Bureau of Water Programs
June 2004

FLORIDA DEPARTMENT OF HEALTH

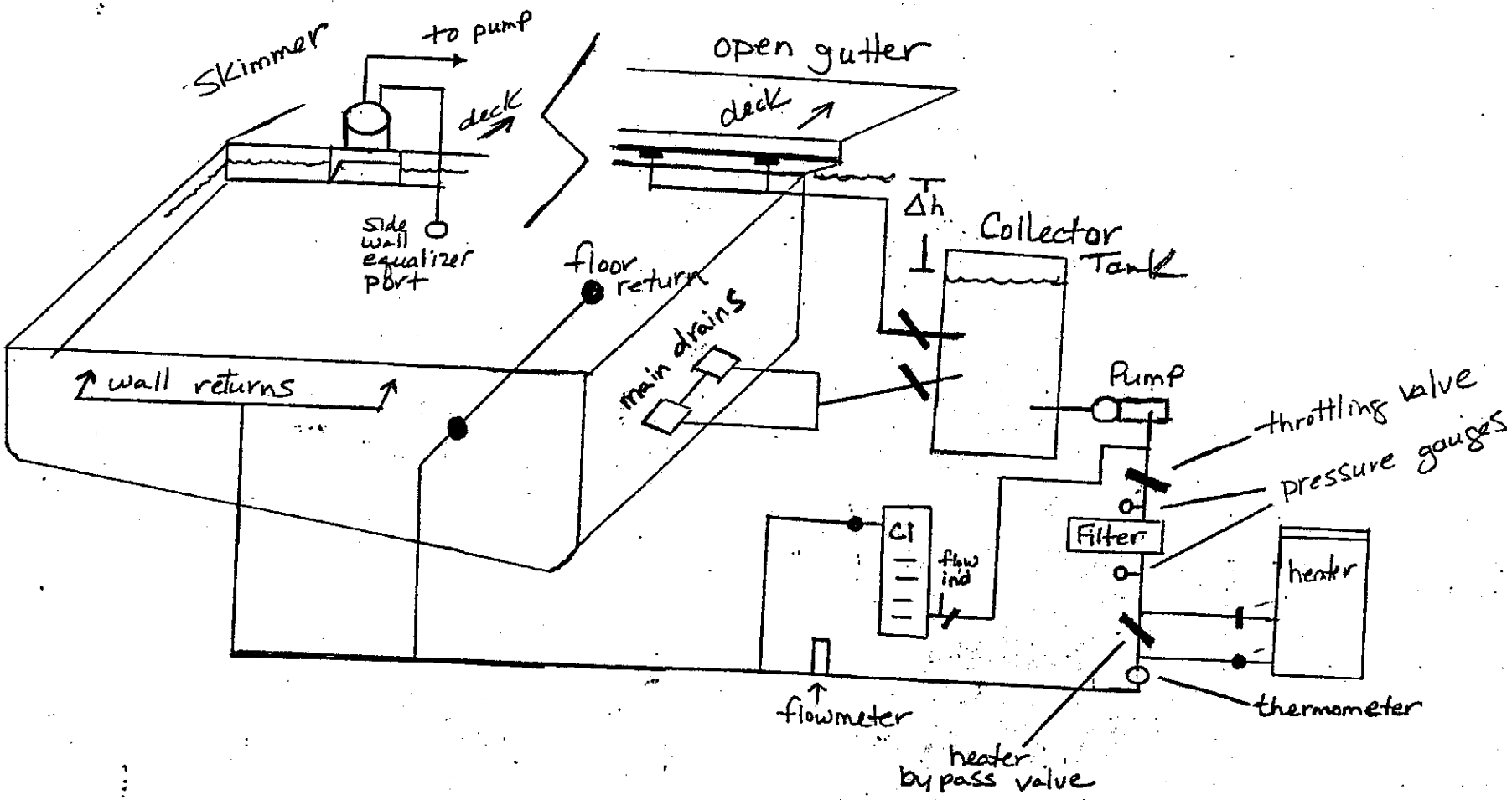
DIVISION OF Environmental Health

Collector tanks are mandated in Florida's state health code to help prevent:

- Body part entrapment on outlet fittings in swimming pools, wading pools and spas.
- Hazards
  - hair entanglement,
  - appendage (limb) entrapment,
  - evisceration, disembowelment,
  - near drowning submersion incidents, and
  - accidental drowning.

Functionality of Collector Tanks

- Provides an alternate protected basin, the collector tank, open to atmospheric pressure from which recirculation / filtration and feature pumps will draw water, thus removing direct suction fittings from the pool shell (except for a vacuum port which should be covered with a flush plug when not in use).


Skimmer
to pump
deck
open gutter
deck
Δh
Collector Tank
side wall equalizer port
floor return
main drains
wall returns
Pump
throttling valve
pressure gauges
Cl
flow ind
Filter
heater
flowmeter
heater bypass valve
thermometer

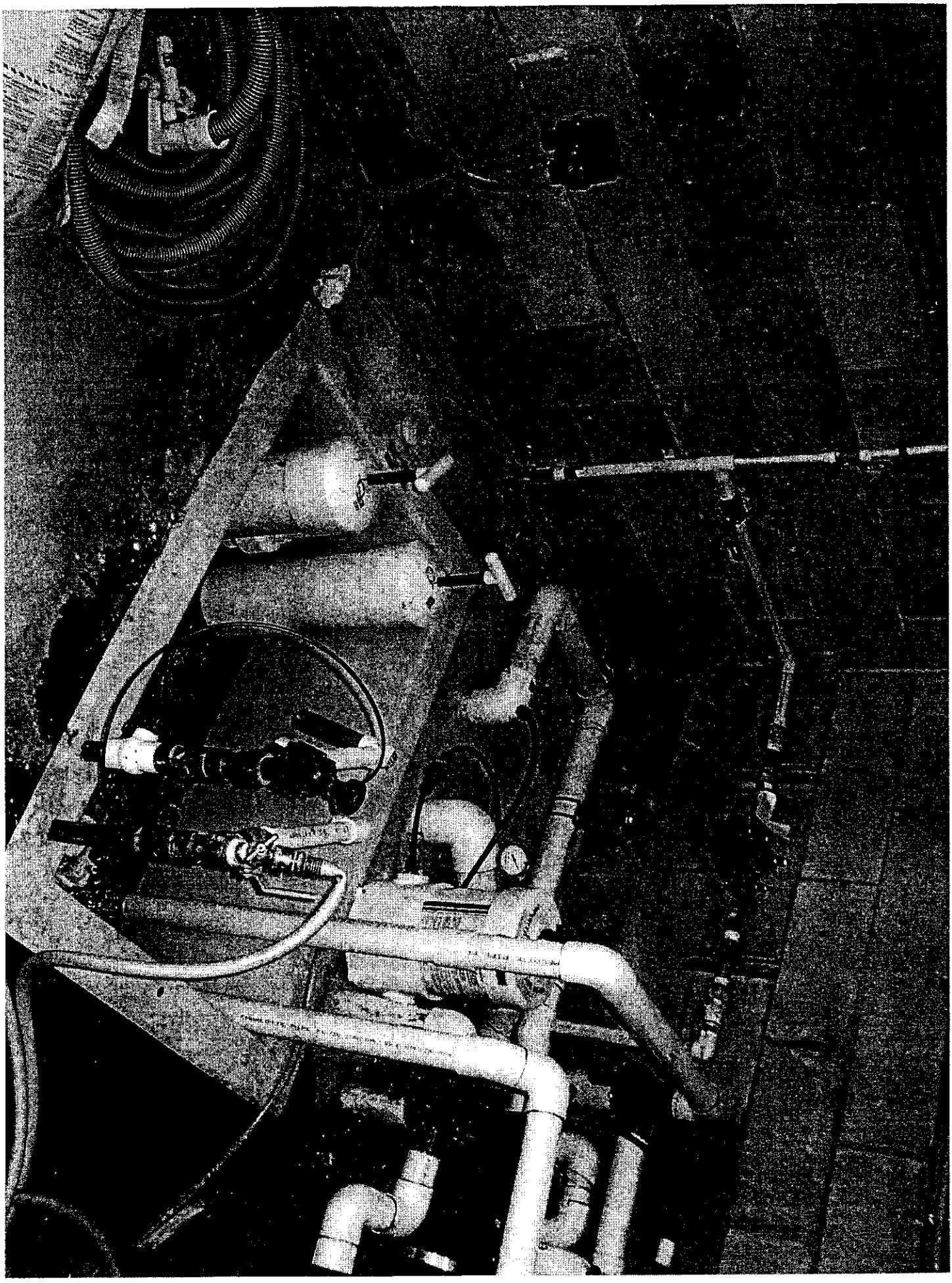
History of Public / Commercial Swimming Pool Regulation in Florida (Currently Florida Administrative Code 64E-9)

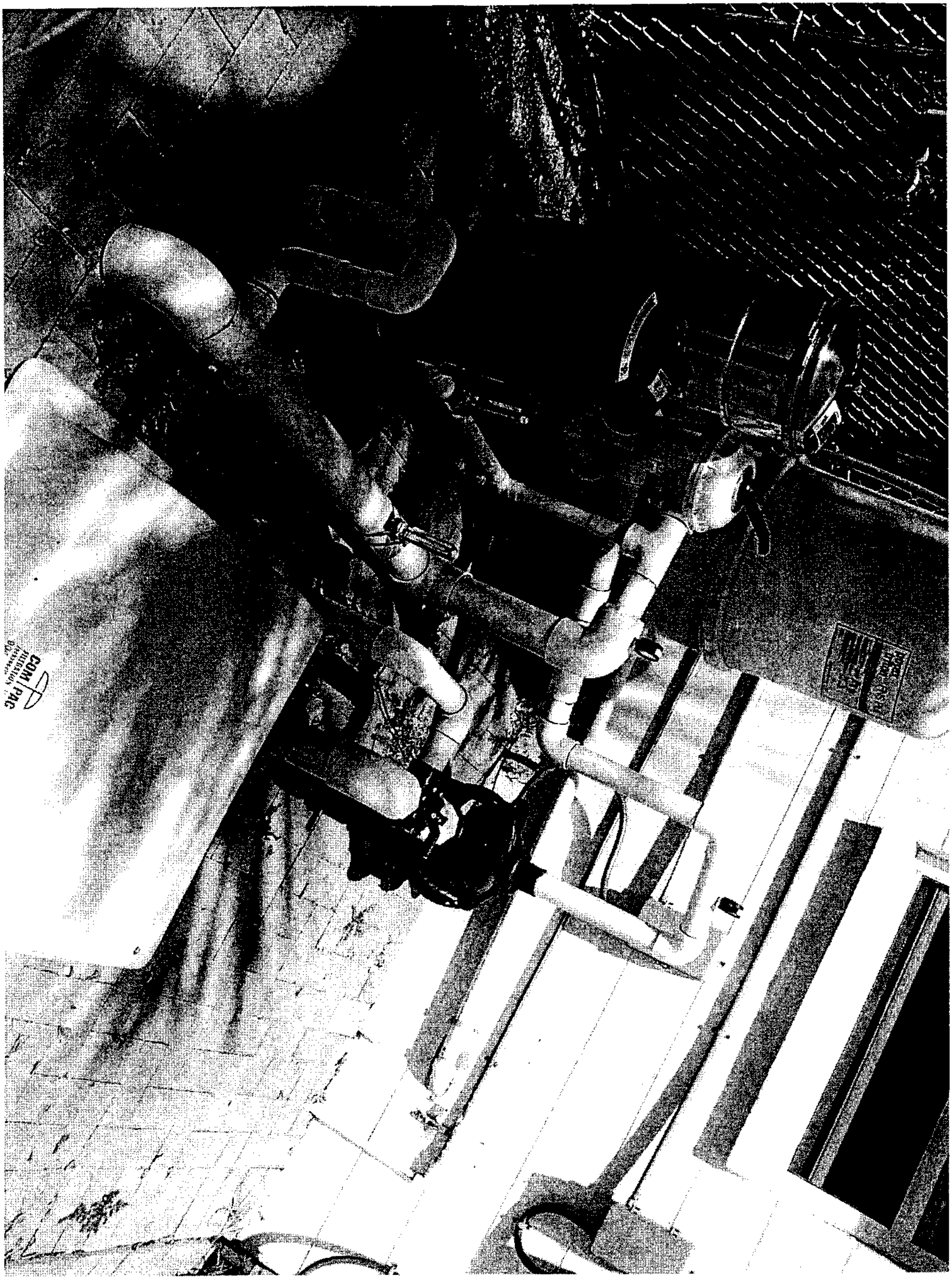
Collector Tanks - Prohibition of Direct Suction

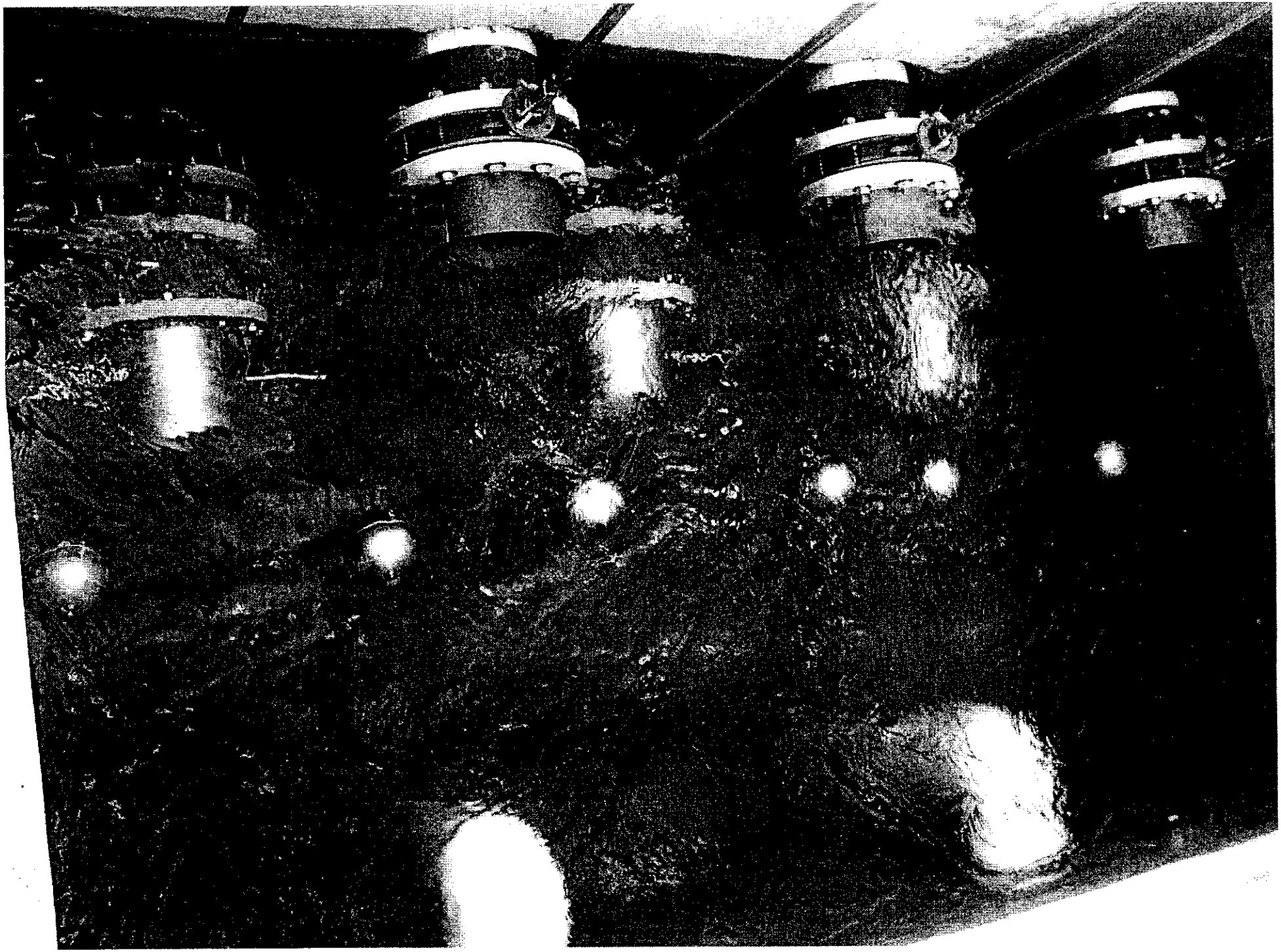
1954-1977	Collector Tanks Not Required
1977-1979	Collector Tanks Required when a vacuum filter is installed
1979-1993	Collector Tanks Required for Swimming Pools. Wading Pools with skimmers were exempted. Spas with less than 200 square feet of surface area were exempted, but were required to have a properly sized vent line for each suction line.
1986-1993	Allowed vent lines in lieu of collector tank when previously approved direct suction pool was modified.
1993-now	Collector Tanks Required on all swimming pools, spas and wading pools.
2004	Specifies 2.25 square feet as the minimum collector tank surface area open to the atmosphere. Requires vacuum ports to have spring-loaded safety covers rather than removable flush plugs.

Direct suction anti-entrapment methodologies utilizing dual or multiple main drains or vent line provisions are susceptible to inherent potential failures.

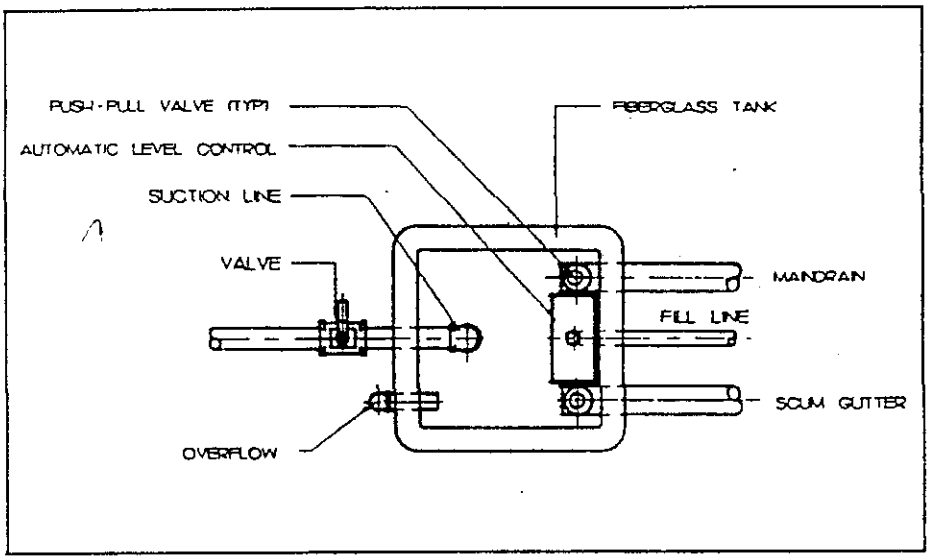
- accidental blockage:
  - debris collection and accumulation
  - scum formation and encrustation at vent line meniscus
- inadequate engineering design:
  - incorrect pipe or pump sizing
  - may cause the pump to suck air prematurely
  - prompting dismantlement or circumvention;
- human negligence:
  - willful dismantlement
  - lack of operator functional understanding
  - poor vent line labeling or capping
  - inadequate testing.




COM PAC



The Collector Tank: A valuable piece of public-pool equipment



The following article was submitted to Service Industry News by Michael Rybolowik, sanitation & safety supervisor for the Swimming Pool and Bathing Places Section of the Dade County (Florida) Health Department's Environmental Health division.

By Michael Rybolowik

The collector tank — sometimes known as a "surge pit" or a "balance tank," is a required piece of equipment on public pools in the state of Florida. It serves two very important purposes in the swimming pool recirculation system.

One function is to keep the water level in the pool at the gutter line constant without falling below the gutter or overfilling the gutter, thus providing continuous skimming action.

The other important function is to prevent direct suction from the main drain, therefore minimizing the possibility of a drowning caused by an entrapment accident.

In order for the gutter or perimeter trough system to properly keep the surface of the pool clean, a consistant skimming action is necessary. Water develops a surface tension that keeps dirt, layer of water loaded with the debris over the weir or lip of the gutter.

It is very important that the water overflowing the lip be no more than about a quarter-inch high. Too high a water level stops the skimming action. And, of course, if the water level drops below the gutter line, there is no skimming action.

Another very important consideration is keeping air out of the pump and making sure that the pump is being fed a constant, adequate supply of water.

The water level in a pool is constantly being affected by evaporation, rain, possible leaks and bathers entering and leaving the pool. Each swimmer displaces about 2 cubic feet (approximately 15 gallons) of water, which also needs to be replaced when the swimmer exits the pool. Also, there is the wave action that is produced by motion created by swimmers, etc.

The collector tank is the part of the recirculation system that solves the problems mentioned above. Water flows from the main drain and the perimeter overflow system into the collector tank. The pump draws water out of the collector tank and moves it through the rest of the

again a product manufacturer. Not a safety advocate Collector Tank.

Tank

From previous page

In order to maintain proper skimming action, the water level in the collector tank needs to be below the pool water level and above the suction line going to the pump. There should be a constant waterfall at the lip of the gutter system and enough water inside the collector tank to feed the pump without any air ingestion.

In addition, there should be enough space to allow for the surges and changes of water volume in the pool.

When the pool is in active use, the water level in the collector tank may be a foot or two lower than the water level in the pool. When the pool is not in use, but the pump is operating, the water level in the collector tank can be very low, sometimes at a level less than a foot above the suction line for the pump.

Many collector tanks are designed with a float valve to control water flow from the main drain. The greater the difference in water level between the pool and the collector tank, the more the water wants to flow from the main drain.

The pump continuously keeps drawing in water to meet its needs, but as the water level rises in the collector tank, pressure diminishes and an equilibrium is established.

At the same time, the surface overflow system is also contributing water to the tank, and as the water level rises, less water flows from the main drain. This is why a collector tank is also sometimes referred to as a "balance tank." Some collector tanks achieve this balance even without a float valve to control the flow from the main drain.

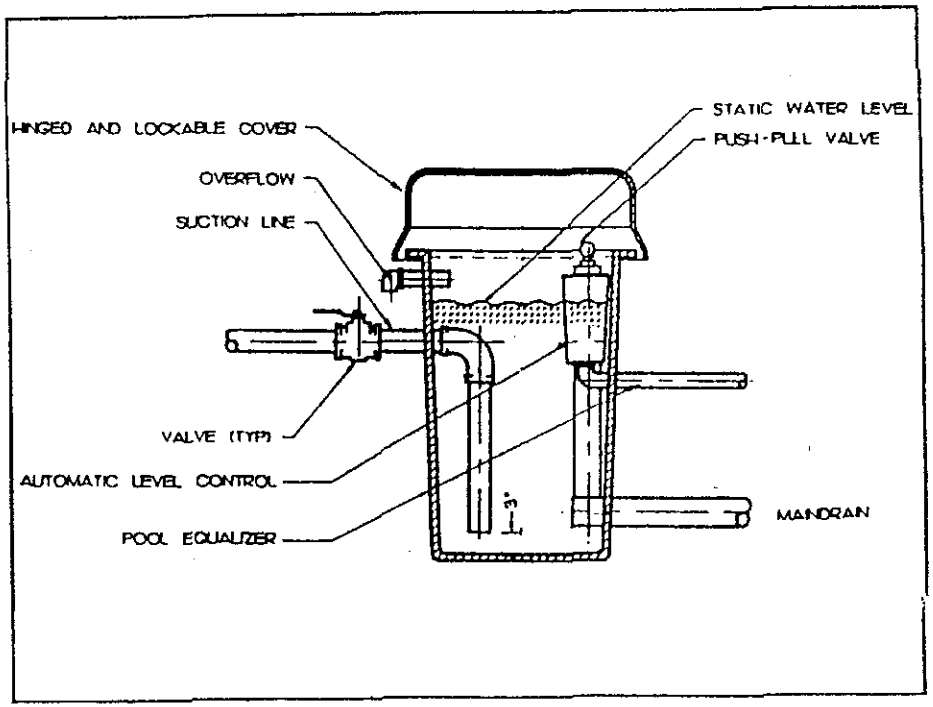
There is a way to fine-tune a collector tank so that it functions at maximum efficiency (even without the float valve).

First, stop the gutter overflow. Sometimes, there is a valve that controls the gutter line. Or else, lower the waterline to below gutter level. (Manually shut off the automatic fill if applicable.)

Next, begin closing down the main drain valve slowly until the water level is very low but safely above the suction port of the pump. You must wait and observe the water level in the tank and make adjustments with the main drain valve as necessary.

Then restore the flow from the gutter system. The collector tank is now functioning at optimum efficiency. As long as the pool's bather load is not exceeded, the collector tank's water level will be below the pool water level, and there will be room for more gutter flow.

The Florida State Public Swimming Pool Code has required the installation of collector tanks on newly constructed



pools since June 30, 1978. And, as of October 1993, even spa pools using skimmer systems are required to be built with collector tanks, though the spa does not have a gutter and only the main drain is connected to the collector tank.

The reason for this is that the collector tank prevents direct suction from the main drain. Water flows from the pool into the collector tank, and the pump draws water from the collector tank. The flow at the main drain cannot exceed 1½ feet per second.

But even if an entrapment accident occurs, water flow from the main drain stops, and the pump draws out the water from the collector tank. When the water level drops below the suction port, air is drawn in, the pump loses its prime and cuts off.

The capacity of the collector tank is required to be at least one minute of the recirculated flow unless justified by the design engineer, according to the Florida State Code. Vacuum filter tanks are considered collector tanks, so vacuum filter systems do not require a separate collector tank. ■

SURVIVORS These entrapment victims esc
with their lives, but their wounds graphi
reflect the violence of their struggles. Wi
safeguards, a typical 8-inch main drain
pump exerting 350 pounds of pressure
become a devastating force.

quiring new public pools to have layers of protection against entrapment.

Other states are less consistent. For example, California requires dual main drains on new residential pool construction, but that legislation does not extend to public pools. In North Carolina, after a 4-year-old girl was eviscerated in a public wading pool, the state implemented a dual main drain law for new and existing wading pools, but no other public pool types.

Even after requiring regulation, some states continue to debate the merits of entrapment legislation. Florida requires dual main drains and a layer of protection on its new public pools, but some industry representatives there are trying to eliminate the layer of protection clause, claiming that dual main drains alone can eliminate the problem.

Across the board, the industry lacks consistent, nationwide training requirements for pool operation and maintenance. Inspectors aren't up to speed on what to watch for, either.

"We can write all the codes we want, but enforcing them is a big task," says Ron Gaffner, co-owner of Aqua Safe, a safety consulting firm in Houston. "[Safety] inspectors are being pulled in a lot of different directions and we, as an industry, have to educate them on what to look for."

Entrapment doesn't happen as
it's still horrible and it's easily
number of victims goes above
much as toddler drowning, but
preventable. Why wait until the
10,000 before we do anything?

Tom Griffiths agrees. "I think the health departments are the key," says the director of aquatics and safety officer for intercollegiate athletics at Pennsylvania State University. "The health departments are primarily focused on water quality ... as opposed to water safety. [They] have been slow to become water-safety conscious. They need to have a checklist that goes beyond pH and chemical balance to make sure the lifeguards are working, that the grates are covered."

But state and county health departments are pressed for time and money, and in states with a high number of pools per capita, small staffs are easily spread thin. That's why industry professionals must police themselves, says Gregory Gordon, president of the Ashburn, Va.-based National Aquatic Council.

"From the time you open your door to let someone into your aquatic facility, you're making sure you're doing what you can to keep it safe," Gregory says. "It's worth investing in anything that protects the public's personal safety as opposed to a lawsuit that costs you a few million dollars."

That investment extends beyond ad
layers of protection, Gordon adds.

"The key is education — having o
ing, updated training," he says. "Make
your in-program training with your
structors, lifeguards, deck guards and s
covers all the possibilities. The operat
the facility has to make sure all the eq
ment is properly working."

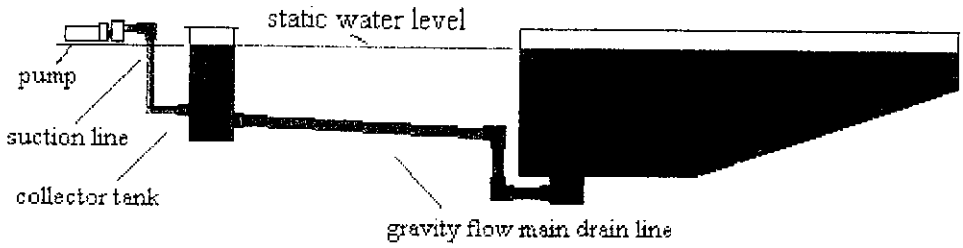
Jeffrey L. Ellis, president of Jeff Ell
Associates Inc., an international lifeg
training and risk-management firm b
in Kingwood, Texas, agrees that no am
of engineering expertise will eliminate
hazard altogether.

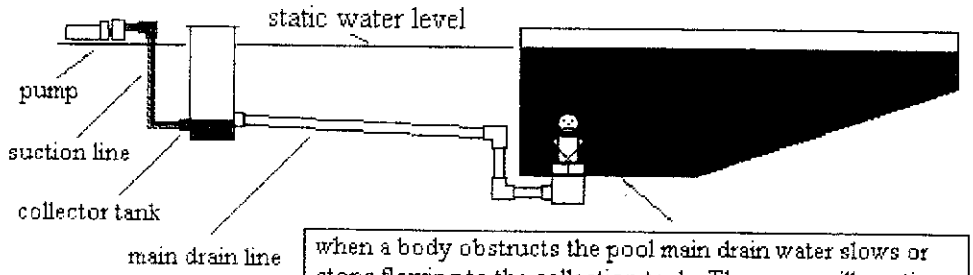
"In each of the cases that we've in
tigated, there wasn't a design flaw,"
says. "There was a human action that
dered the safety device ineffective. In
case, someone had moved or completel
moved the barrier that was in place."

Ellis suggests the key to preventic
training operators and lifeguards on
merous levels. First, they have to k
where the drains are located and check
the covers are secure. Second, lifegu

GRAVITY FLOW COLLECTION TANK SYSTEM

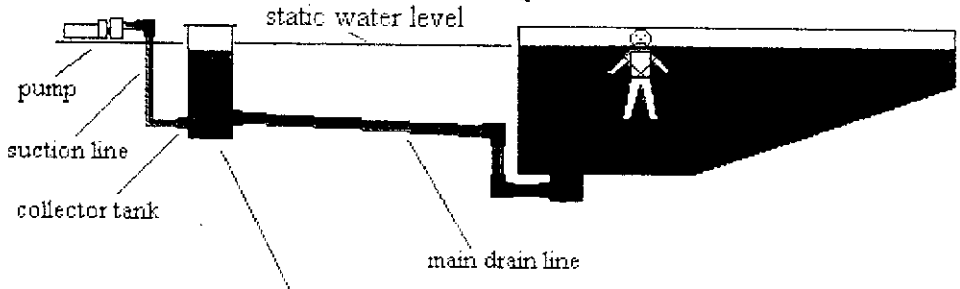
water will flow at approximately 3' per second through a properly plumbed main drain line from the pool to a collection tank. A pump can then draw suction from that tank without causing entrapment. Here's how it works:





when a body obstructs the pool main drain water slows or stops flowing to the collection tank. The pump will continue to draw water until it loses prime or the tank has emptied.

Since the collection tank is open to atmosphere, no suction is exerted on the main drain line. This allows the body to move from the drain area with no potential for entrapment.



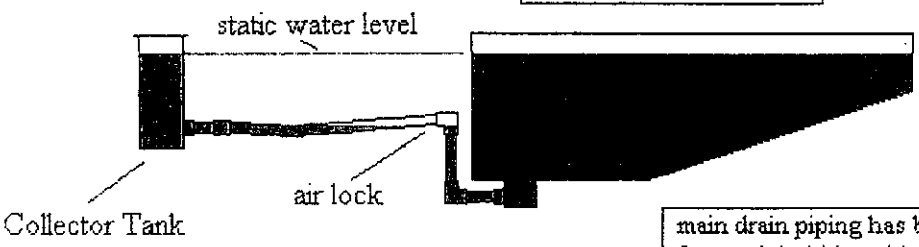
since full flow has been restored to the main drain line, the collection tank will refill with water and the pump will regain prime.

A properly installed collection tank has no moving parts to malfunction, no wiring to corrode or be severed and absolutely no potential for entrapment. In short, the gravity flow collection tank system is the only foolproof anti-entrapment device available.

MANUFACTURED AND SOLD BY VAK PAK, INC. JACKSONVILLE, FL. (800)877-1824

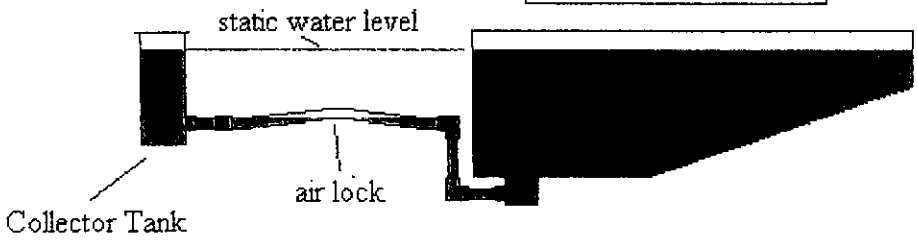
Residential Collector Tank Installation

Incorrect piping install

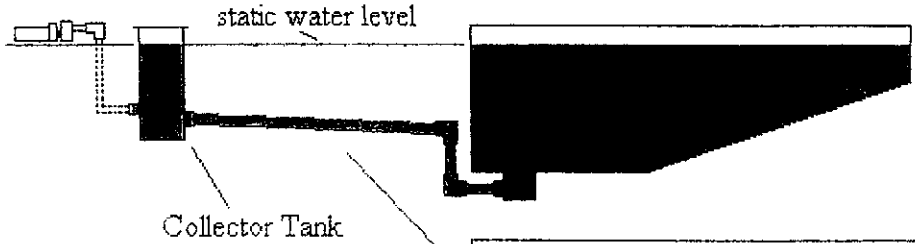


main drain piping has been installed to allow for an air bubble to block water from flowing properly from the collector to the pool.

Incorrect piping install



Correct installation



correct installation of main drain piping will allow water to flow without restriction from the pool to the collector tank.

Pipe size	max.gpm	tank drawdown
3"	65	26"
4"	110	18"
6"	260	12"

based on approximately 75' distance between pool and collector

Paul Pennington

From: paul pennington <paulpenn@earthlink.net>
Date: Tue Jun 8, 2004 1:46:23 PM US/Pacific
To: RHAMMOND@CPSC.GOV
Subject: Field Hearing

Dear Ms. Hammond, I would like to be listed as a speaker at the upcoming CPSC field hearings in Tampa, Fla. on June 21, 2004.

My primary topic has to do with educating the EMTs-Emergency Medical Teams on reporting swimming pool and spa entrapment, hair entanglement, limb entrapment accidents. Currently these accidents are being reported as drownings. Later this week I will fed-ex to you copies of magazine and newspaper articles I wish to read into the record. These articles are quoting different emergency response personnel stating that there is no space or box available to them to categorize what caused the drowning.

I would also like to speak about the need for "layers of protection" on swimming pool and spas.

Thank- You for your valuable time. Paul Pennington

HUNTINGTON BEACH; Spa Warnings Reiterated Following Girl's Drowning: [Orange County Edition]

DAVID HALDANE. **The Los Angeles Times (Pre-1997 Fulltext).** Los Angeles, Calif.: Feb 27, 1996. pg. 2

Full Text (497 words)

The weekend drowning of a 12-year-old girl whose hair got sucked into the vent of a hot tub has prompted renewed warnings about the dangers of spas, especially the older single intake-type built before the enactment of safety codes.

"I've seen several of these {accidents} and every one of them happened in an old-style spa," Donald Boland, a spokesman for the Huntington Beach Fire Department, said Monday of the drowning of Krista Humphrey. "You remember every one of these; it's not like a car accident. These are the things that stick in your mind."

The accident occurred Sunday night at the home of Humphrey's grandparents on Maui Circle, where she and her parents were visiting from their home in Houston.

The girl was in the spa alone about 8 p.m., Boland said, when her hair was apparently sucked into an intake valve, and she was pulled underwater.

By the time relatives had cut her hair to free her, the fireman said, she had lost consciousness. She later died at a hospital.

The incident closely resembled another in Villa Park just seven months ago that nearly took the life of the 6-year-old son of former Ram player Greg Meisner. In that case, however, Meisner was able to save the boy's life by wrenching him free of the drain, which left a 10-inch-diameter bruise on the youngster's back.

The drowning of a 9-year-old boy in 1976 prompted county officials to begin requiring two vents rather than one in all spas built in unincorporated areas. Designing spas with two vents, said Larry Nees, manager of building inspections for Orange County, significantly decreases the amount of suction in each one.

The county also began requiring that vents be covered and constructed in a manner designed to prevent hair or body parts from being pulled in.

Huntington Beach, where Sunday's drowning occurred, eventually adopted similar standards, said Bill Grove, the city's inspection manager, but not in time to affect construction of the spa in which Sunday's accident occurred.

(BEGIN TEXT OF INFOBOX / INFOGRAPHIC)

Spa Safety

Here are some precautions to keep in mind if you own a spa:

* Avoid problems with a single drain by installing a second one to disperse suction.

* Install safety dome on flat drains.

* Instruct anyone with long hair not to get it near a drain, and tell anyone who uses your spa not to stick fingers, toes or other body parts into drain.

* Place power switch nearby so it can be reached quickly in case of emergency.

* If your spa is indoors, lock the door to the room or use a cover that locks.

* Closely supervise children, even if they know how to swim.

* If you are concerned about a spa's safety, check with a building inspector.

* For more information, call the Orange County chapter of the National Spa and Pool Institute, (714) 832-1113.

Sources: National Spa and Pool Institute; Children's Hospital of Orange County

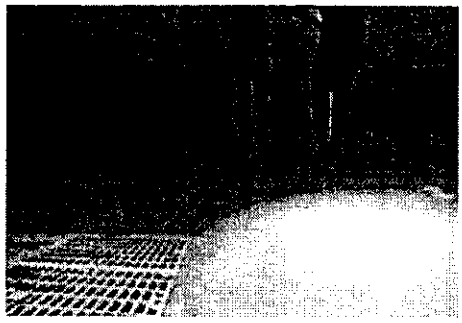
Los Angeles Times

Article types: Column; Brief; Infobox
Column Name: *Community News Focus*
Section: *Metro; PART-B; Orange County Focus Desk*
ISSN/ISBN: 04583035
Text Word Count 497

Troubled Waters

Suction entrapment is an emotional issue fraught with frightening stories and costly litigation. But just how widespread is the problem and what should the pool and spa industry do about it?

By Bob Dumas October 2003



The police report refers to the 7-year-old girl simply as "Drown Person."

But cloaked in the anonymity of that field investigation report are the true identity of the victim and the tragic circumstances that took her life. Both could change the pool and spa industry as we know it.

The victim in this case was Graeme Baker, the granddaughter of James Baker III, former secretary of state under President George Bush. While she did, indeed, technically drown, the events surrounding the accident are far more insidious. The police report lays them out in horrific detail:

The mother ... tried to pull her daughter out of the pool. The mother could not lift her daughter from the pool and struggled greatly. Two persons then came to her assistance and pulled the girl out by her ankles.

Upon arrival, units ... were on the scene performing CPR on [Drown Victim] ... [and we were] advised that they had no pulse or heartbeat on the young girl. There were approximately 75 [persons] on the scene when this unit arrived. A graduation party was being held at the residence.

Eventually, the report leads to this revelation: *It was later*

MORE INFORMATION

■ **The legacy of evisceration**
An evisceration accident still haunts an industry professional today.

■ **Viewpoints**
Members of the industry speak out about suction entrapment.

READER RESPONSE

■ **What do you think?**
Was this article helpful... informative... inspirational...? Send your thoughts to poolspanews@hanley-wood.com.

determined that the girl's hip or butt was suctioned to the drain.

On June 15, 2002, Graeme Baker, a member of a powerful, politically influential family, was the victim of suction entrapment.

Historically, the pool and spa industry has never felt completely comfortable discussing safety issues. There's a thin line between educating consumers and casting the product in a negative light. Suction entrapment, in particular, is an issue that has resulted in industry in-fighting and finger pointing over exactly how widespread the problem is and who should be held responsible. But one thing is clear: If industry members don't take aggressive steps to solve the problem soon, forces from outside the industry may do it for them.

Although no lawsuits have yet been filed in the Baker case, a family spokesman issued a statement to *Pool & Spa News*, clearly indicating that the writing is on the wall.

"The swimming pool and spa industry has been well aware of these risks since the late 1970s," says Robert T. Hall, an attorney for Nancy and James Baker IV, Graeme's parents. "Their products are especially hazardous to children. Since the 1980s, there have been at least 147 entrapment incidents documented, resulting in 36 deaths."

Hall goes on to say that the Bakers plan to hold the industry accountable for the suction entrapment phenomenon.

"We pledge to do all within our power to see that this industry meets its obligation to an unsuspecting public," he says. "[Graeme's] senseless death should be a wake-up call for this industry to accept responsibility for all such deaths and injuries and be accountable for the decades it has ignored its duties."

Today, the general public and even many within the industry, remain unenlightened when it comes to this issue. What exactly is suction entrapment and how does it happen? More importantly, how often does it happen?

A powerful force

Children are fascinated with the current created by a swimming pool's circulation system, often sticking their hands or feet in its path just for the thrill of feeling the powerful force of the suction. Litigators like to refer to such a thing as an "attractive nuisance."

That "nuisance" is compounded by the aging of America's pools, inconsistent construction standards and millions of unaware consumers.

Occasionally, drain covers break, or are removed by people who don't know the possible repercussions. When this happens, a swimmer playing with the drain can become stuck to the outlet much the way the hose of a vacuum cleaner sticks to your palm. The force of a pool's suction can be tremendous: 350 pounds of pressure for an 8-inch main drain with a standard pump. This "suction entrapment" will hold the bather in its grip until either the vacuum is broken, or he or she drowns, defying the rescue efforts of onlookers.

There are actually five types of suction entrapment:
• Body entrapment (a section of the torso becomes entrapped).
• Limb entrapment (an arm or leg is pulled into an open drain pipe).
• Hair entrapment or entanglement (hair is pulled in and wrapped around the grate of the drain cover).
• Mechanical (jewelry or part of the bather's clothing gets caught in the drain or the grate).
• Evisceration (the victim's buttocks come into contact with the pool suction outlet and he or she is disemboweled).

Entrapment survivors: These swimmers escaped death, but they bear the marks of their struggles. With a typical 8-inch main drain and pool pump exerting 350 pounds of pressure, the suction can create a powerful force.

In the past decade, a variety of methods have been used to address the problem. Yet, the industry lacks consistent, nationwide training requirements for pool building and maintenance. Currently, each state has its own series of complex, sometimes contradictory codes that are hard to even understand, let alone enforce.

"We can write all the codes we want, but enforcing them is a big task," says Ron Gaffner, co-owner of Aqua Safe, a safety consulting firm in Houston. "[Safety] inspectors are being pulled in a lot of different directions and we, as an industry, have to educate them on what to look for."

Some of the solutions offered include the elimination of single-source suction. Remember the vacuum cleaner hose mentioned earlier? Imagine there are two hoses connected to the same motor, and one is covered by your

palm. Air would travel through the other hose, interrupting the suction to your hand. The same concept can be applied to pools by building dual main drains instead of a single one.

Another solution lies in a number of safety vacuum release systems, aka SVRS. These devices are designed to shut off the pump when they sense an excessive vacuum buildup.

Finally, there are anti-entanglement drain covers, a type of fitting that is molded in a particular way to prevent hair entanglement.

These systems make up what anti-entrapment advocates refer to as "layers of protection." Many believe that if such measures become mandated standards, the suction entrapment problem will go away.

Lawmakers in California, Texas, Florida, Ohio and New Jersey have recently legislated all or part of these protections. However, there are still states, such as Texas, that don't even require contracting licenses for pool builders, allowing anyone with a backhoe and a business card to join the industry. It's states such as these where pool builders are more likely to either not know or care about standards — mandated or otherwise.

Safety in numbers

The saying goes that one suction entrapment death is one too many and, consequently, lawmakers should mandate safety requirements for the way pools are constructed.

But the reality is that solid data revealing the true extent of suction entrapment would go a long way toward persuading the cynics. The Consumer Product Safety Commission, the federal agency charged with gathering such data, says its numbers are not completely reliable. This is due to a lack of awareness on the part of emergency personnel, who often report entrapment casualties simply as drowning victims.

The quandary is that entrapment incidences are relatively rare and this makes it easy for the problem to slide under the radar.

Pat Taaffe, an engineer with the Cedar Hammock Fire Department in Bradenton, Fla., says a majority of rescue workers just aren't savvy about the suction entrapment issue. "The personnel in my company didn't know about [suction entrapment] until about two years ago," he explains. "In the past, we would have reported it as a drowning or near-drowning."

The problem is that rescue workers have more pressing tasks than worrying about the reports they fill out hours

after the incident has taken place, according to Dan Schmidt, director of public information at the Fairfax County Fire and Rescue Department in Virginia — the department that responded in the Graeme Baker case. A rescue worker's primary focus is saving lives.

Picture a busy emergency room in a suburban hospital. Paramedics wheel in a critical patient, lungs filled with water. An overworked doctor tries in vain to save the young victim's life. In the wake of tragedy, the physician will likely name the cause of death as "drowning" without much attention paid to what caused the accident in the first place.

"In the Baker case, we tried to resuscitate, but she was pronounced dead at the hospital and then it was finished for us," Schmidt says. "I don't see anything wrong with adding another box on the form [to report entrapment incidences], but I think ultimately the pool industry needs to police itself to make sure pools and hot tubs are as safe as can be."

Paul McCain, a firefighter in Sunrise, Fla., and co-owner of Play Safe Systems, a company that makes an anti-entrapment device, says that he's been guilty of filing incomplete reports as well. "Every time I ran on a drowning call ... it was reported as a drowning — nothing about how it happened," he says. "I could have run across a [suction entrapment call] and never knew it."

Between January 1985 and March 2002, there were 147 confirmed, recorded suction entrapment incidences, according to CPSC records. Fifty-one of those were hair entanglement, 79 body or limb entrapments (including three eviscerations), four mechanical and 13 unknown. Of the 147 incidences, 36 resulted in deaths.

Even though these figures are relatively low, it's clear the problem is underreported.

Jacquie Elder, the CPSC's assistant executive director for hazard identification and reduction, notes that most of the data is anecdotal, so the numbers are probably low. "We have ways to get [the information], a number of sources," she says. "[We use] hospital emergency rooms, death certificates, incident reports via news clips or reports to our hot line or Web site. But there are cases where it might be difficult to find out."

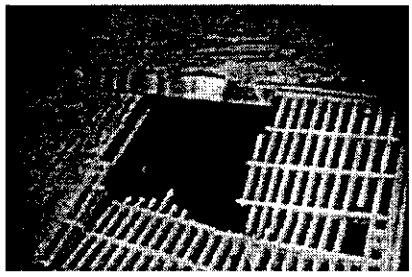
Still, safety experts think the industry can do more.

"[Suction entrapment] doesn't happen as much as toddler drownings, but it's still horrible and the thing is, it's easily preventable," says Merle Stoner, owner of Poolguard, a North Vernon, Ind., manufacturer of pool safety products, and a member of the ASTM executive committee on

consumer products. "Why do we have to wait until [the number of victims] goes above 10,000 before we do anything? The industry needs to be proactive."

What's to be done?

Over the past several years, the debate over just what to do about suction entrapment has polarized the industry. Some were initially taken aback when SVRS manufacturers campaigned to have states mandate their devices on public pools.



Danger below: Broken or missing drain covers increase the likelihood of a suction entrapment tragedy.

"There is not one solution for all five forms of entrapment, that's for sure. So when the SVRS manufacturers portrayed themselves as the one solution, I think that's what got the industry a little angry," says David Nibler, director of new business development and marketing at Water Pik Technologies, a pool equipment manufacturer based in Newport Beach, Calif. "But now I think they've accepted the idea of layers of protection, and I see the industry accepting them more for doing that. I definitely subscribe to layers of protection — backup systems."

Though many industries blanch at the idea of government involvement in the way they do business, the National Spa & Pool Institute (the industry's largest trade association) has been more agreeable to the idea as long as legislation focuses on layers of protection without mandating specific products.

Yet last summer, when the International Code Council revised its residential code, it added an appendix that calls for SVRSs on both single and multisource suction pools. Industry reaction was tempered somewhat by the fact that states adopting the new law have to specifically cite the SVRS appendix to make it local law. While ICC officials know that 42 states have adopted the new code, there is no way of knowing how many also have taken on the SVRS appendix.

"I haven't heard of anyone adopting it," says Paul Armstrong, vice president of architectural and engineering services for ICC. "It's hard to say for sure."

For its part, NSPI has begun to write its own voluntary standards designed to prevent suction entrapment.

"The standards will describe the phenomena and break it

down into the five categories and then define the technologies that will take care of each specific type of entrapment," says Carvin DiGiovanni, the trade group's senior director of technical education and government relations. "It won't damage the existing SVRS [market]. In fact, it will embrace it."

But besides relying on codes and standards, what should industry members do? Are pool and spa equipment manufacturers culpable for the products they produce? A Miami jury certainly thought so. In September 2003, it found pump manufacturer Sta-Rite liable for $104 million in the suction entrapment of teenager Lorenzo Peterson, who was left in a vegetative state after getting his arm entrapped in an apartment complex pool's main drain. It is the largest judgment to date against a maker of pool or spa equipment.

"They were found liable in that they had a design defect," explains Michael Haggard, the attorney representing the Peterson family, who claims pump manufacturers should have a built-in device that senses vacuum buildup and then automatically shuts down.

Many in the pool and spa industry thought the Peterson jury had missed the point. "The Sta-Rite judgment was absurd," says Bill Kent, president of Horner Equipment, a manufacturer and distributor of pool products based in Fort Lauderdale, Fla. "I think ultimately [individuals] should be responsible for their own activities. And as long as [products] are safe in the normal use pattern, I think, morally and ethically, we can feel good about them. But the court has decided that something bad has happened, so someone has to pay for it."

The problem, says Water Pik's Nibler, is that the industry is a "custom-built project" business. "We can't always foresee the conditions and design parameters," he says. "You can never [predict] how the end user might abuse normal, logical safety parameters. You just can't control 100 percent of all situations."

Maybe not. But if pump manufacturers, along with pool builders themselves, don't take matters into their own hands, the jury awards are likely to continue to grow and the federal government may decide it's time to step in. It did so in 1996 with the automotive industry, making airbags a legal requirement in the wake of strong consumer demand.

"Why wait until we have one summer when [a number of] kids are getting entrapped and it hits the papers?" Stoner asks. "We don't want to wait, and then react and get a black eye. The thing is, all this stuff can be fixed. And it's more business for the industry [by selling safety products], while at the same time putting a good image on it.

"Making safer pools — tell me how that's a negative thing. It's win-win."

Pool & Spa News *would like to thank Joe Cohen, owner of Fail-Safe, for his contributions to this article.*

Return to Top

Home | Directory | Education | Archives | Ask an Expert | Forum
Current Issue | Awards | Classifieds | Calendar | About Us | Subscriptions

Reasonable Choices

By William N. Rowley

Suction-entrapment incidents and their causes have been of passionate interest to mechanical engineer and commercial pool designer William N. Rowley through more than 30 years of tests, investigations, debates and high-profile lawsuits. Here, he uses his standing as an expert to define what's involved – and to promote safe engineering and construction practices while offering a comprehensive look at ways of preventing these incidents.

It's one of the most horrific things that can happen to anyone who enters a pool or a spa: One moment you're having fun or relaxing, and in a terrible instant you're caught in a devastatingly painful and potentially fatal situation.

Most people who become entrapped by pool, spa or wading-pool plumbing do survive, but all too often they suffer life-altering injuries. As with any aquatic safety issue, we all agree these incidents should be prevented, and a great many talented people from government, trade associations, research institutions, equipment manufacturers and consumer-safety groups have invested a tremendous amount of time in examining suction entrapment. For all of that effort, however, seeing our way to adequate solutions has proved a difficult and persistent challenge.

The fact that there are different types of suction-entrapment incidents that happen in varying combinations of conditions and in various settings is what makes determining exact causes and suggesting remedies so frustratingly complex. Furthermore, the fact that children are often the victims of these gruesome accidents makes emotions run so high that reason is often a second casualty.

But fortunately, suction entrapment is a matter of applied hydraulics. We can turn in the clear light of day to hard facts of science and engineering in searching for answers. By studying how and why these incidents occur and applying what we learn with scientific testing in controlled conditions, a much clearer picture of the problem – *and* its solutions – unfolds before us.

Lightning Strikes

Let's begin with a basic definition: A suction-entrapment incident is one that involves a bather becoming trapped on a drain. The bather is either injured by the force of the entrapment itself – or drowns or nearly drowns.

There are four basic types of suction-entrapment incidents:

- *Body entrapment*, in which (usually) the stomach, abdomen, hip or posterior becomes trapped on a "single-suction" main drain with a broken or missing cover;
- *Limb entrapment*, in which the person has a hand or leg sucked into the suction pipe in the sump of an uncovered, "single-suction" main drain;
- *Evisceration*, in which someone sits on an open or broken "single-suction" main drain and is disemboweled;
- *Hair entrapment (entanglement)*, in which a person is trapped by entanglement of his or her hair in a grate or a "single-suction" drain. This is not a result of suction alone, but rather has to do with turbulence caused by water velocity.

There is a fifth type of incident included by some who study these issues: This category is referred to as *mechanical entrapment*, in which someone gets a digit stuck in a hole of some kind and can't get it out. This doesn't have anything to do with suction, and the steps you'd take to prevent the four main types of suction entrapment have very little to do with preventing mechanical-entrapment incidents.

None of these incidents occur with any great frequency. From January 1985 to March 2002, the Consumer

Product Safety Commission (CPSC) documented 147 entrapment incidents, 36 of which resulted in death. Additional incidents may have gone unreported during that time frame, but it's safe to say that all *known* incidents – especially those involving serious injury or death – have been investigated in painstaking detail.

Many of these incidents have been the subjects of lawsuits, some resulting in huge monetary awards to victims. A small number of these cases have been covered extensively in the media and have generated lots of rhetoric from sources both informed and uninformed.

What stands out is that each incident, whether notorious or obscure, fatal or survived, involves a unique set of circumstances and highly individualized conditions having to do with exactly what went wrong.

Stepping Back

The most dispassionate way to examine this collection of incidents is to break everything down into statistical terms as matters of hazard/risk analysis. In simplest terms, *hazard* equals *risk* multiplied by *exposure*.

In applying such measures, it must be considered that entrapment incidents occur in three different types of bodies of water – swimming pools, spas and wading pools – with each presenting a different level of *hazard*.

Technically speaking, the *risk* in all three bodies of water is the same in that suction-entrapment risk can be defined as occurring anytime someone comes in contact with an open main drain – more specifically with a single-suction main drain in which only one line is plumbed to a pump.

Bear in mind, however, that the *exposure* represented by these three categories of bodies of water is completely different, which is why the *hazard* is different between them. For example, you would expect a child playing in an 18-inch deep wading pool to sit on a drain. Likewise, it's not unexpected for someone to come in contact with an open drain in a three-foot-deep spa.

In a swimming pool, however, main drains are typically (but not always) found in deeper water, so the *exposure* is not the same. You won't typically see people sitting on main drains in deep ends of pools; what you *will* see, with far greater likelihood, is someone who sticks his or her arm into an open drain.

Each type of incident in each type of vessel carries its own set of statistics for different sorts of circumstances. For example, I personally know of only one hair-entanglement incident that has occurred in a swimming pool. We also know that most hair entanglements occur in spas, while limb and body entrapments (but not evisceration) occur in pools. Evisceration typically only happen to small children, and almost exclusively in wading pools.

How you approach the study of these problems and how you weigh the statistics must depend on the conditions that influence the hazard.

As you look closely at how these incidents occur, key observations emerge that can be used in drawing important conclusions. I've looked quite closely at these incidents and have participated directly in several studies on entrapment – including various tests in which I have used my own body as a test subject, deliberately "trapping" myself on exposed drains under carefully controlled conditions.

What We Know

One of the important things we've learned through such testing is that when you get near an open drain, you can't feel any suction at all, even when you're just a few inches away. To become trapped, you have to get right down on the drain, at which point lightning strikes and you're in trouble.

We've also learned that with a drain cover in place – be it an anti-vortex drain cover or a standard drain grate – it is virtually impossible to suffer a body or limb entrapment or an evisceration. Moreover, we've observed that in systems with *split* main drains, you cannot become trapped even if a grate or cover is missing.

The facts observed from incidents in the field are consistent with these findings: In every case of suction entrapment (with the exception of hair entanglement), you'll find a broken or missing main-drain cover combined with single-suction plumbing.

That's a huge problem, given how many pools built through the years have been plumbed with single-suction drain configurations, and the hazard is compounded when the drain covers are missing in these vessels. (It's important to note that testing as well as anecdotal evidence show that entrapment incidents simply do not occur in pools, spas or wading pools equipped with dual or multiple main drains.)

Controlled studies and field data also indicate that proper flow rates established in conjunction with appropriate drain covers and grates will prevent suction entrapment. I don't know of a single incident in which a cover approved by the American Society of Mechanical Engineers (under ASME/ANSI A112.19.AM-1987, "Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs and Whirlpool Bathtub Appliances") and operating within the specified flow rates has been involved in any kind of entrapment incident.

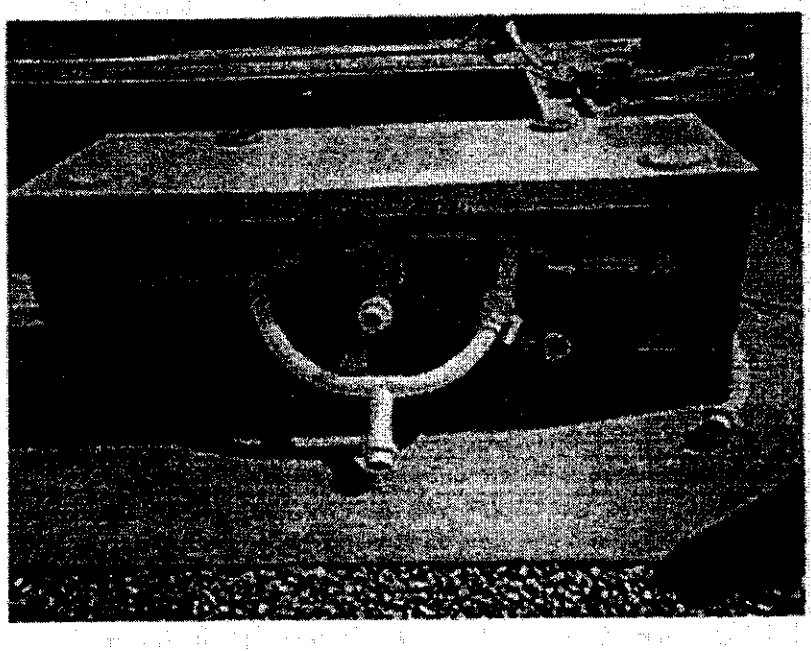
A study conducted by the National Swimming Pool Foundation (NSPF) in 1997 concluded that maintaining a pump suction velocity of less than six feet per second with covered drains (either single or dual) will relieve entrapment concerns. To be sure, excessive flow rates may result in hair-entanglement incidents even if the cover is in place – but *only* in situations in which the flow rate exceeds the cover's or grate's specified operating conditions.

Obviously, flow rates are a different issue in systems with extremely large plumbing, such as those you might find in a waterpark, lake or reservoir. In these systems, where plumbing might measure 18 or 24 inches in diameter, you run into a condition where, even at slow flow rates, the kinetic energy of the water's flow can suck a person into an uncovered pipe.

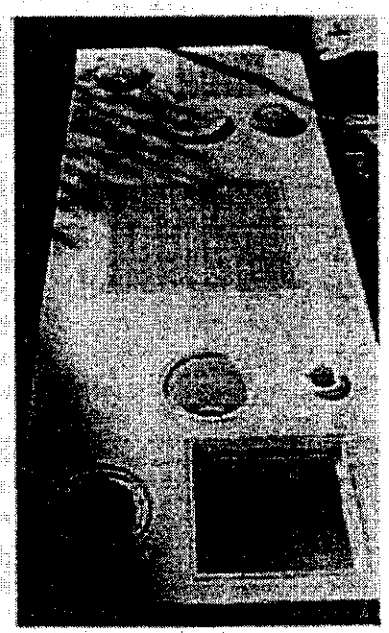
Within Bounds

Moving back to residential and commercial pools, the maximum-flow standard of six feet per second is endorsed by CPSC, NSPF and the National Spa & Pool Institute and has been accepted by a majority of health departments throughout the country.

There has been less consensus among the experts, however, when it comes to whether or not anti-vortex drain covers provide a greater level of safety than do



To determine what happens in suction-entrapment incidents under observable, recordable conditions, we developed a test stand that features drain lines set up with a variety of covers and grates. (There are also open sumps to replicate situations in which a cover or grate is missing.) The stand was placed in the shallow end of a pool for actual testing. During these tests, valves and flow rates were precisely monitored and controlled.



grates – and no statistical evidence to support the superiority of either type.

In my view, both grates and anti-vortex covers are effective safety measures, the key being whether or not they are properly attached. I've always been somewhat concerned that, in shallow-water applications, anti-vortex drain covers present a tripping hazard because of their slightly raised profile, but the bottom line is clear: Both systems work in preventing accidents – and no expert I've ever encountered has ever questioned that assumption.

Keeping any drain cover attached is the key to long-term safety and is essentially a service/maintenance issue of simple but profound importance. Indeed, it is possible that the number of entrapment incidents could be reduced by an ongoing campaign to encourage service technicians, health-department inspectors and certified pool operators to make the checking of grates and drains a top priority.

(Along more mechanical lines, it has also been suggested that manufacturers could help by making bolts or other fasteners for their drain covers in a different color from the drain itself, making for easier visual inspection from the surface of the water.)

What is increasingly clear in most conversations about entrapment issues is that drain configuration is the other key component here, and the one that has proved most controversial. For my part, I am a strong advocate of the concept of split main drains and see them as a logical remedy for entrapment problems. At the same time, I see opposition to split drains as ill founded and a denial of statistical data and information gathered from the field.

Categorically, I do not know of one suction-entrapment incident that has *ever* occurred in a system with a functioning split main drain, regardless of the presence of a grate and even in a system with an excessive flow rate. In my view, this simple fact means that every pool, spa and wading pool built should be equipped with split drains at least three feet apart (as defined by a number of studies).

I've conducted tests and investigations in the field during which I've tried to trap myself onto drains with missing grates in the presence of flow rates well in excess of six feet per second. So long as the drain is split, *absolutely nothing happens.*

Legal Momentum

All of this is why, in 1997, the California legislature passed Senate Bill 873, a law requiring that all wading pools be plumbed with split main drains. So compelling was the reasoning behind it that the law was actually made retroactive and closed all existing, non-compliant wading pools until they could be remodeled.

A great deal of controversy and debate surrounded passage of this bill, largely because of the key provisions that made it retroactive. But some aggressive lobbying on the part of the pool and spa industry, a good bit of late-minute politicking and the fact that there really aren't *residential* wading pools ensured the bill's passage.

It is worth noting that there has not been a single entrapment incident of any kind in any California wading pool since the bill became law. Also in California, the legislature passed Senate Bill 1726 in 2002. This law requires split main drains on all new spas and pools.

The challenge of passing legislation of such clear merit points up the difficulty of mandating the split-drain solution as a virtual cure-all for the entrapment problem: There are literally millions of pools and spas out there that were built with single-drain configurations, and there's no practical way to mandate retrofitting for every single one of them. As a consequence, with single-drain systems we must rely on proper flow rates and especially on covers to prevent entrapment incidents.

In some circumstances, a drain can become plugged – a point often made by those who go on to claim that split drains plug more easily than do single drains. Nothing in the data suggests that this is the case, although I know of one case in which a single pressure-test plug was left

Breaking the Circuit

Suction vacuum-release systems, or SVRSs, encompass a relatively new category of sensitive mechanical or electro-mechanical devices designed to sense a change in suction pressure and, in response, either open a vent valve or turn off the pump to prevent suction-entrapment incidents.

My own exploration and evaluation of these technologies leads me to believe that they are yet to be perfected, but it is nonetheless sensible to suppose that such devices provide yet another layer of safety. And certainly, such systems may prove useful as an aftermarket item for use on pools with single-suction drains.

I do not, however, view SVRS technology as the magic bullet some system promoters have suggested. To my mind, there is no substitute for sound hydraulic design and proper construction practices in preventing suction entrapment.

More specifically, because SVRS systems operate by sensing a change in suction pressure, they do nothing to prevent hair-entrapment incidents, which do not always result in complete blockage of a drain grate or cover. Furthermore, medical data indicates that in evisceration incidents, disembowelment occurs almost instantaneously, and SVRS systems will never be able to deactivate a pump in time to prevent injury. Shutting off the pump does nothing immediate to stop the inertia of water flowing through the system.

Proponents of these technologies are working hard in legislatures and courts to make their point that equipment manufacturers should be required to rig their pumps with SVRS devices. It is my view that this is the wrong solution for suction entrapment. Pumps do not cause suction entrapment; rather, improper hydraulic design, installation and maintenance do.

To my mind, prevention is best achieved using the principles of hydraulics and what science teaches us about the physical characteristics of the human body.

– W.N.R.

in a split-drain system, causing it to function as a single drain. To that point, it is a matter of common sense to note that two or more drain lines must be open for split drains to be effective.

Also, it's important to note that testing has revealed that the skimmer does *not* function as a second drain when it comes to preventing suction entrapment. This means that a single, uncovered drain sharing a suction line with a skimmer can still invite entrapment. We've found that because skimmers are set at different elevations from the main drain, they function differently than do drains at the same elevation and therefore do not provide the safety of split drains.

The design standard we use, as called out in the California legislation, is based on the simple idea that if one of the drains is plugged, the other will continue to operate within design parameters with respect to flow rate through the grate or cover.

As mentioned above, these drains must be three feet apart. This is based on anthropometrics of the human body. With the drains set three feet apart, human beings are simply not big enough to lie across and block both drains. In addition, the T for the split between drains needs to be far enough away from both drain apertures so that a person can't reach down into the drain and get his or her hand caught in a single-flow situation if one of the drains is open.

In any new installation, it is in my opinion simply dangerous and obsolete to install single drains. Furthermore, retrofitting existing bodies of water with split drains should be suggested, promoted and encouraged at every turn and in any way possible.

Margins of Safety

All of this anecdotal and statistical data boils down to some straightforward assumptions about situations that are dangerous. Specifically, swimming pools, spas and wading pools with broken or missing drains covers or grates and single drains combined with excessive flow rates are all conditions common to the vast majority of entrapment or entanglement incidents.

At the close of its 1997 study of suction entrapment, NSPF stated flatly, "Only if all three hazardous conditions are prevented does a safe condition exist." I agree wholeheartedly with the inescapable logic of that conclusion and the attendant notion that safety must therefore be defined as redundancy within any given system.

According to CPSC, NSPI, NSPF and ASME, the first safety measure required to prevent suction entrapment is a grate or cover in good operating condition, attached so that it can't be removed except with the use of tools, meaning a screwdriver or a wrench of some kind. Second, the cover should be approved and should operate as designed. (ASME established these operating standards in 1987 – a development that stands as one of the key advances in the fight against suction entrapment.)

By most definitions, split drains are a second layer of protection, and it's important to point out that they needn't be limited to two in number. I've heard some people argue that using two drains simply means that two people can drown instead of one in the unlikely event that two people could get stuck on two uncovered drains at exactly the same instant.

This has not happened to my knowledge, but there's nothing that says three or four drains can't be used instead of two. I would argue that the likelihood of three or four people sticking on three or four open drains at the same time is so incredibly unlikely that it represents no measurable hazard.

As stated above, suction flow rates at or below the threshold of six-feet-per-second are crucial. With commercial pools, the situation changes somewhat because you can end up with designs with enormous pipes and massive pumps turning over hundreds of thousands or even millions of gallons of water in a matter of hours. At that level, attention to line velocity and plumbing configurations is even more critical, which is why, in typical 50-meter competition pools, we'll install up to four main drains, each covered by a pair of 18-inch-square grates, giving each a total of 36 by 18 inches of grated coverage. These grates are so big and the flow through them is so slow that there is no chance that anyone could become trapped on them.

A further safety measure that can be

employed with any sort of drain system, commercial or residential, involves the use of atmospheric vent tubes – essentially standpipes that are plumbed to the main drain line and that, in the event all drains are blocked, allows a pump to pull air into the suction line. This causes the pump to lose its prime rather than dead heading and is a proven solution to entrapment problems; obviously, however, it can only be used with new installations or in the event of major renovation.

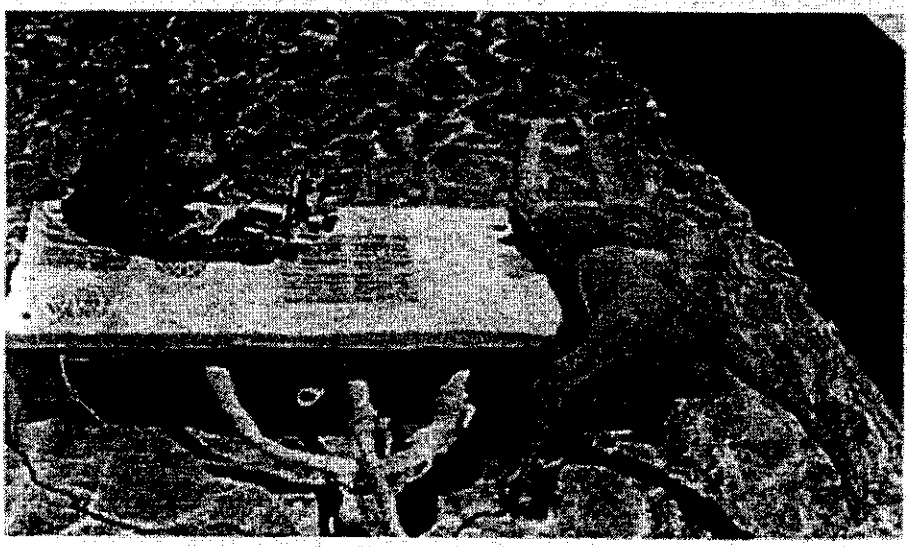
Shut-off switches are another measure of safety, and they've been successfully employed in numerous spas and wading pools. With large commercial pools, however, you run into the problem of people shutting the pool off for other than emergency reasons, be it a prank or just a mistake. When you deal with the cost and time involved with restarting some of these complicated systems, many of which run on three-phase power, these infrequent shutdowns can become a maintenance and operational nightmare.

Finally, there is a new class of devices known as *suction vacuum-release systems* (SVRSs) that can also be used as an added measure of safety in single-suction systems. For more on this technology, see the sidebar on page 32.

Grounds of Prevention

The encouraging and abiding truth about suction entrapment is that it is entirely preventable. For all of the complexities and case-specific intricacies of these incidents, we know what solves the problem: proper covers or grates, split drains and specified suction-side flow rates. Based on what we know today, to argue against these measures is to resist the preponderance of evidence and the weight of reason.

The problem, of course, is that the real world is rife with bodies of water that are lacking one or more of the necessary safeguards and can and will regrettably become sites for future entrapment incidents. For that reason, it is incumbent on everyone in this industry to work in any way we can to promote and insist on these fundamental solutions and to continue to study the problem with the further objective of refining our understanding of this vexing issue.



For the testing, I entered the water and positioned myself over the operating test stand, attempting to entrap myself on individual grates, covers or open sumps under a range of test conditions. Those conditions were quite realistic, as the welts on my midsection testify. What we determined is that entrapment occurred only with single-drain configurations; no such entrapment occurred with split-drain systems.

CPSC FIELD HEARING ON SWIMMING POOL SAFETY
June 21, 2004
Florida Swimming Pool Association (FSPA)
Comments by David Oxley, Past President & Safety Committee Chairman

Good morning, I am David Oxley, a Past President of the Florida Swimming Pool Association and founding chairman of their Safety Committee. Our organization has over 950 member companies employing over 15,000 swimming pool professionals.

The FSPA has consistently been a proactive leader in Swimming Pool and Spa Safety, and we want to be involved in any CPSC events working for the prevention of drowning.

For the second straight year, FSPA has worked with Governor Jeb Bush to declare June as Florida Swimming Pool Safety Month. His annual emphasis serves as a cornerstone for our fifteen (15) Regional Chapters, as they conduct events that generate public awareness of pool safety.

We, as the professionals of the industry, view Swimming Pool Safety as a process that begins with design and customer education to be sure that the latest Safety devices are considered, controlled access to the pool is guaranteed, and the customer has developed a working Safety Plan. In short, accident prevention we believe, starts with customer awareness of the hazards and risks, and ownership responsibility must be established well before a pool or spa is purchased.

In the area of preventing childhood drowning, I would like to quote some of the findings from the latest National Safe Kids Campaign report. This report, entitled, "Clear Danger – A National Study of Childhood Drowning and Related Attitudes and Behaviors", was released in April 2004 and covers accidental drowning in recreational swimming, boating and bathtubs. Not just swimming pools and spas.
The accident statistics point to several important recommendations:

1. *"Adults must increase the quality of their supervision of children around water, as nearly 88 % of deaths occurred **while** the child was being supervised". "Supervision" in this report did not necessarily mean in line of sight*

2. *"Parents are overconfident about their children's safety and abilities."*
3. *"Adults must install multiple layers of protection around home pools and be consistent in using barriers that do exist."*
4. *"More children should be enrolled in swimming lessons taught by a certified swimming instructor." 74 % of drowning victims in the reviewed deaths did not know how to swim.*
5. *Encouragingly, drowning deaths of children ages 1 to 14 have* ***declined*** *40 % from 1987 to 2001.*

In addressing childhood drowning relating to swimming pools and spas, we strongly support the installation of physical barriers while supplying access control. Also the FSPA endorses the concept of *layers of protection,* which could include alarm systems giving instant warning when the isolated area of the pool or spa has been penetrated.

When children are in the vicinity of the pool or spa constant "line of sight" supervision is *mandatory.* Clearly, a review of childhood drowning points to the *personal responsibility* aspect of supervision that allows for the timely actions required to prevent a drowning. Direct supervision is in fact the first layer of protection for reducing childhood drowning.

As I remarked earlier, we are actively promoting the education of pool and spa owners in the preparation of an *owner's Safety Plan.* It is a responsibility of the owner to consider their obligation to sit down and make a plan and enforce that plan. Taking the time to make an individual Safety Plan requires that all hazards are considered. No single plan will fit all installations, and this is why each individual pool and spa owner must go through this exercise, and then enforce the plan.

The FSPA in conjunction with our national affiliate, the National Spa and Pool Institute (NSPI) has been involved in efforts to eliminate the potential for physical entrapment on all swimming pools and spas. The NSPI works with national standards writing organizations and is preparing an Entrapment Avoidance Standard that will help reach this goal. In Florida the building codes require all newly constructed pools and spas to be built with either a system of dual main drains with approved safety covers, or pools designed with no main drains but rather gravity flow holding systems. This standard of construction is a proven method for preventing entrapment, and thus removes another hazard that could result in drowning.

In Florida we have over 750,000 in ground and 250,000 above ground swimming pools, and the question is how do we hope to reach these owners? Even though a high percentage of owners use pool and spa service companies to care for their facilities, there currently is no licensing requirements in Florida for companies or individuals to *clean and chemically treat* swimming pools and spas. Without proper licensing, there is no way to contact or educate these individuals. These service companies need to have a basic foundational education in the repair of swimming pools and spas, knowledge of water chemistry for proper water quality, and an awareness of safety problems that can lead to accidents or drowning. For example the importance of properly installed and functioning drain covers is an often undetected hazard. Also these people need to have an awareness of the American Disabilities Act (ADA) requirements that affect many of our elderly citizens in the state.

Our organization has begun the process of sponsoring legislative changes that will set educational and licensing requirements for service personnel. It is our goal to identify to the owners safety hazards that need to be corrected, and professionally be able to perform the work required. Also with trained service personnel the entire subject of swimming pool and spa safety can be emphasized to the owners with recommendations and corrective action. Our plans are for successful passage of this legislation during the **2005 Florida Legislative Session.**

Finally the FSPA will continue to participate in public awareness activities that stress all aspects of swimming pool and spa safety. In addition to activities sponsored by our many area Chapters, we have developed a consumer web site in cooperation with the State of Florida that emphasizes the importance of safety for swimming pools and spas to prevent incidents and reduce the number of childhood drownings.

Thank you for the opportunity to contribute to this CSPC hearing.

David Oxley
Past President, FSPA, 2002
Safety Chairman, FSPA, 2003 & 2004

Speech of Penny Taylor Miller for Hearing for June 21, 2004.

Penny Taylor Miller

I am not going to introduce myself today as there are some other names that deserve recognition here today rather than my own. One of those names belongs to my daughter, Nicole Ashley Miller. Nicole was born July 16, 2001 and passed away September 6, 2003 when she drowned in our above-ground swimming pool in the backyard. Since September 6, 2003, there have been seven other accidents in the South Florida area that resulted in the loss of children's lives, and I think it is appropriate to mention those names I have been able to find,

Zachary Carlberg, 2 years old, drowned in a swimming pool, October 19, 2003
Joshua Morace, 3 years old, drowned in a canal, October 21, 2003
Jake Delgaizo, 2 years old, drowned in a canal, 2003
Cheyanne Miller, 20 months old, drowned in swimming pool, January 16, 2004
Lefton, second grader, drowned in swimming pool, March 1, 2004
Dodly, age 4, drowned in canal March 9, 2004

I think these are the names that we should remember today. This is why we are here. These are our children. They are not just statistics.

That said, I have thought long and hard about what I can contribute to this water safety meeting. I have determined that my insight can help to come up with a solution to put a stop to these tragic deaths. Therefore, today, I would like to speak to the counsel about two particular things. First, the role education could play in saving lives, and second, the role of requiring safety requirements upon the pool manufacturers and how that could save lives.

Throughout history, many people that inspire us today have talked about the importance of education. Aristotle, Thomas Jefferson, Albert Einstein, Mark Twaine, are just a few. I, like them, believe this is one of the most important assets we have. Marian Wright Edelman said that education is for improving the lives of others and for leaving your community and world better than you found it. Another great quote I found was from Nelson Mandela who said education is the most powerful weapon you can use to change the world. However, Epictetus once said, it is impossible for a man to learn what he thinks he already knows. Here is where our problem lies.

Before my daughter drowned, I purchased an above ground pool. It is safe I thought to myself. All I have to do is take the pool ladder down. I thought I knew all there was to know about why and how children drown. If you would have asked me back then, my answer as to why children drown would have been because parents just simply are not watching their children!! Well guess what, I learned the hard way, that is just not the case. One of the toughest battles to resolving this problem is to educate the parents on a subject they think they already know about, and don't.

How do we do this. I don't know exactly. I do know that every time I see parents with small children that I share my story in hopes that I can enlighten them on the urgency of learning water safety. Every time I do this, it is my hope that my small voice can make a difference.

But this counsel has much better odds to make a difference. Education is one of the key

ways to do this. I know that there are newspaper articles and sometimes commercials that are attempting to educate parents about this problem, but I can tell you from experience that I never saw them prior to my daughter drowning. Why. Parents are watching Sesame Street and Blues Clues, and running around with their children. They do not have time to sit down and read the newspaper and watch the commercials running on TV, or the new story about children drowning. So how do we reach this target population. My idea is to have brochures made and have them disbursed at the daycare and pediatrician offices. But it is not just enough to have the brochures made up and dropped off. There needs to be someone there to urge the parents to read it. To let them know that reading this one 5 minute pamphlet this could save their child's life. Either people like myself, or firefighters, police officers, etc. I think this tactic would provide better results in obtaining the education that is required to save our children's lives.

My other solution that I wanted to discuss today was the idea of requiring safety devises to be sold directly with the pool. Think about it. We require safety devices to be sold with many dangers products sold. Chipper shredders, lawn mowers, etc. Now even blow dryers have a electrical breaker cutoff for safety. So why not require pool companies to provide a safety device for swimming pools. A pool alarm, for example. I promise you, if I had been provided with one, I would have used it. The sad fact was I did not even know you could purchase them for above-ground pools. The bottom line is that pools are a dangerous product. And that product requires a safety device. It is time to make this happen. It is time to save lives.

There is also an African Proberb that I have taken to that says it takes a village to raise a child. I have furthered this saying to it takes a village to raise a child and a nation to save one. We, as a nation, must step up to the plate. We have to make sure parents become educated about the dangers that exist and offer assistance in providing them with the necessary tools to prevent drownings. We need to, as a nation, require pool companies to supply a safety devise, such as a pool alarm, for their unsafe product, and to provide safety materials and/or videos with each sale. These measure can help save lives. I truly believe Nicole would be alive today if these measure had been in place prior to her accident, and urge you to consider these actions as part of your solution to today's tragic problem.

I will leave you with one last quotation from William Yeats. Education is not the filling of the pail, but the lighting of the fire. Let's get this fire going and save the lives of our future, of our children. Thank you for your time.

Carole de Ibern
Josh de Ibern

Hammond, Rocky

From: cdeibern@juno.com
Sent: Friday, June 11, 2004 9:48 AM
To: Hammond, Rocky
Subject: Tampa Hearing

Good Morning Rocky,

My name is Carole de Ibern. I left a message on your voice mail yesterday regarding my desire to speak at the Tampa Hearing. I then called Deborah Tinsworth and she recommended that I e-mail you immediately. My son, Preston de Ibern, had a near drowning accident when he had just turned 5 years old (in someone else's pool). I never realized the magnitude of this problem until it happened to us! There was no way to turn back the clock or change anything that had happened, all that was possible from that point on was to find a way to prevent it from happening to other children. Thanks to the help and dedication of Debbie Wasserman Schultz, legislation was enacted to begin the process of saving others. The legislation was named after Preston and a little girl who drown. The baby's grandmother, Kathy Ward, sought me out and asked how she could help. For several years she made the long trek to Tallahassee to testify in favor of legislation. The bill was also name after her granddaughter, McKenzie Merrium. I am going to contact her today and see if she will come and speak at the Tampa hearing as well and I will have her contact you, if you is interested.-

Preston passed away in Dec. of 2002. For the first time I will be speaking in public without him by my side. June 21st would have been Preston's birthday! My older son, Josh de Ibern, who is 22 years old, has decided that he would like to speak as well. His speech will be no more than 2 minutes and I would like him to speak before me, if that is possible. (I'm afraid he won't be able to stand before the crowd after hearing me talk about his brother) Drowning prevention has become my passion and I speak to everyone I can about what they can do to make a difference.

I realize that you have a schedule to plan and a time frame which has now passed. I hope you will be able to fit my son and I into the schedule. I would like a full 5 minutes for my speech and I would also like to use several visual affects, which I will bring with me, if that is ok with you. We would like to discuss the following:

Josh - 2 minutes

- Brother Preston
- Impact on my life
- How life has changed

Carole - 5 minutes

- Preston's life/accident
- Impact on family
- No going back
- Pool fencing/legislation
- Awareness/understanding

Thank you so much for taking the time to read this lengthy letter! I apologize for not being aware of the hearing or deadlines earlier. I only found out about the hearing after a reporter came to my home to do a story this week. I hope that you will find a way to include us in your schedule as I believe that we can make a positive impact on the audience.

Sincerely,
Carole Y. de Ibern
cdeibern@juno.com
727-772-1587 Home
727-244-0609 Cell

Christopher Bengivengo

Paper on Swimming Pool Safety for CPSC Hearing June 21, 2004

Christopher Bengivengo - Director Suncoast SafeKids Coalition.
Chair, West Central Florida Drowning Prevention Coalition.
Division Chief / Fire Marshal Dunedin Fire & Rescue.
Nationally Registered Paramedic.

Background: Pediatric Drowning continues to be a leading cause of death for children under the age of 14 in the State of Florida. The majority of pediatric victims drown in residential swimming pools (Pinellas County has over 65,000 backyard swimming pools) while in the care of one or both parents. According to EMS statistics gathered within Pinellas County, the majority of submersion events occur in residential swimming pools and involve white males under the age of 4.

Mission: The West Central Florida Drowning Prevention Coalition has a mission to eliminate all pediatric drowning incidents through an aggressive education and awareness campaign. The group is comprised of Public Educator members from area Fire and EMS agencies, State of Florida Public Health, Pinellas County Schools, Local Law Enforcement, All Children's Hospital, and individuals concerned with child safety.

Message: The primary message is, **Be Prepared!** And follow these safety tips:

Never leave your child alone in or near a swimming pool, hot tub, or wading pool even for a moment.

Enclose your pool or spa with four-sided fencing at least five feet high, with self-closing and self-latching gates. Do not use your house as one of the four sides.

Learn CPR and keep rescue equipment, a telephone, and emergency numbers by your pool.

Use door alarms, pool alarms, and automatic pool covers for extra protection.

Teach your child to swim, but never rely solely on swimming lessons to protect them from drowning.

And most importantly…

Assign a Designated Child Watcher at all times that children are in or near the water.

U.S. Consumer Product Safety Commission Public Hearing on Water Safety in Tampa, Florida on Monday, June 21st at 10:00am.

Testimony from Melanie Hall, M.S. from SAFE KIDS Tampa coalition
Led by St. Joseph's Children's Hospital of Tampa.

Local drowning data in Hillsborough County for 2002 showed 11 drowning deaths for ages 0-14. The median age of the children was 1 year old and the locations for drownings were swimming pools with 7 deaths, bathtub with 1 death, open body of water with 2 deaths and one unspecified death. In 2003 Hillsborough county showed 7 drowning deaths for ages 0-14. The median age of the children was 1 year old and the locations for drownings were swimming pools with 6 deaths and bathtub with 1 death.
Source: 2002 and 2003 vital statistics death data files, Florida Department of Health.

Near drownings locally are a major concern, Since April 2004, St. Joseph's Children's Hospital has had quite a few near drowning admissions into the pediatric emergency room. Most of the near drownings involved swimming pools and lack of supervision, including lack of pool barrier fencing and lack of locks on exterior doors. Thankfully, the children that received CPR immediately after the incident were kept for observation and released from the hospital shortly after. The ages are consistent with the national data, ranging from 1-4.

The following testimony will be an overview of the report newly released in April 2004 from National SAFE KIDS and Johnson and Johnson; Clear Danger, A National Study of Childhood Drowning and Related Attitudes and Behaviors.

HEALTH CARE COSTS AND SAVINGS
Near-drownings take a tremendous financial toll on affected families and society as a whole. Typical medical costs for a near-drowning victim can range from $75,000 for initial treatment to $180,000 a year for long-term care. The total cost of a single near-drowning that results in brain injury can be more than $4.5 million.

SAFE KIDS' objectives in conducting this study were to examine the circumstances of drowning in children ages 14 and under and determine the knowledge, attitudes and behaviors of parents regarding water safety. As children approach adolescence, they are given more freedom and begin to take greater responsibility for their own safety. For this reason, SAFE KIDS also surveyed "tweens" (children ages 8 through 12) to assess their knowledge, attitudes and behaviors about these four important components of water safety: ***active supervision*** by a designated adult, ***safe water environments***, ***proper gear*** and ***education***.

Child Death Review Survey Results
Data from 496 unintentional childhood drowning deaths were submitted to the National SAFE KIDS Campaign. They represent 89 percent of all unintentional drowning deaths occurring in these 17 states from January 2000 to December 2001. Unintentional drownings made up 95 percent of all drowning deaths among children ages 14 and under

reviewed by these states. Sixty percent of the reviewed drowning deaths occurred among children ages 4 and under. The majority of drowning victims in reviewed cases were male: 72 percent versus 28 percent female. Despite this considerable exposure to water, parents do not feel that their children are especially vulnerable to water hazards. Though it is the second leading cause of injury-related death for children ages 1 to 14, more than half of parents (55 percent) reported that they do not worry very much or at all about their child drowning.

SUPERVISION

Child Death Review Survey Results

Eighty-eight percent of children were under some form of supervision when they drowned. These results are consistent with past studies indicating that childhood drownings and near-drownings typically occur when a child is left unattended or during a brief lapse in supervision. Sixty-eight percent of children were in or near the water right before the drowning incident, and 32 percent were last known to be in another location in or around the home, most commonly playing outdoors (31 percent).

Parent and Tween Survey Results

Nearly all parents (94 percent) report that they always actively supervise their children while swimming. However, deeper examination reveals that parents participate in a variety of distracting behaviors while supervising their child. One in five parents (20 percent) believes that when lifeguards are present, the lifeguard is the main person responsible for supervising children in the water. Most parents (55 percent) felt there were some circumstances where it is okay for a child to swim without adult supervision.

ENVIRONMENT

Child Death Review Survey Results

Of all drownings reviewed, 39 percent occurred in pools. Reviews determined that younger children (ages 4 and under) were most likely to drown in home settings (26 percent) and pools (44 percent), while drownings among children ages 5 to 14 occurred most often in open-water sites (51 percent). Studies show that installation and proper use of four-sided isolation fencing could prevent 50 to 90 percent of childhood residential swimming pool drownings and near-drownings. In reviewed deaths where barriers were breached, 63 percent of victims entered through an open or unlocked gate.

Parent and Tween Survey Results

Nearly two-thirds (61 percent) of pool- and spa-owning parents have no isolation fencing, and 43 percent have no self-closing and self-latching gate. *Pool-owning parents are even less likely to have other important safety devices near their pool – 82 percent have no shepherd's hook, 73 percent have no posted CPR instructions and 64 percent have no phone with emergency numbers.*

GEAR

Child Death Review Survey Results

Nearly all children (97 percent) in reviewed cases who drowned in pools or open bodies of water were not wearing a personal flotation device at the time of the drowning. It is

estimated that 85 percent of boating-related drownings could have been prevented if the victim had been wearing a PFD.

Parent and Tween Survey Results
Many tweens admit that they never wear a PFD when on a boat (16 percent), participating in water sports (37 percent) or riding a personal watercraft (50 percent). Parents do not always model safe behavior for their children. While only 4 percent of parents of children who go on boats reported that their child rarely or never wear PFDs while on a boat, nearly a quarter (23 percent) report that they themselves do not wear PFDs when accompanying their child on a boat. Some parents mistakenly believe that toys and swimming aids can protect their child from drowning.

EDUCATION

Child Death Review Survey Results
Nearly three-quarters (74 percent) of drowning victims in the reviewed deaths did not know how to swim. Seventy-three percent of victims ages 5 to 9 did not know how to swim, while only 30 percent of victims ages 10 to 14 did not know how to swim. None of the victims ages 4 and under knew how to swim. Swimming lessons often include survival skills training that may be useful in an emergency.

Parent and Tween Survey Results
Although 82 percent of parents agree that all children should take swimming lessons by age 8, nearly four in ten parents (37 percent) of children ages 5 to 14 report that their child has never taken lessons. In addition, 39 percent of tweens report that they have never taken swimming lessons. Twenty-four percent of parents of children ages 5 to 9 and 11 percent of parents of children ages 10 to 14 report that their child is a non-swimmer or a poor swimmer. This does not match up to the findings that half of parents (54 percent) believe that swimming lessons can prevent children from drowning.

CONCLUSIONS

- ***Parents are overconfident about their children's safety and abilities around water.*** Although drowning is the second leading cause of injury-related death for children ages 1 to 14, more than half (55 percent) of parents say that they do not worry much or at all about their child drowning.
- ***Drownings most commonly occur in recreational settings, often pools and open bodies of water.*** In fact, national data suggest that more than 385 children ages 14 and under drown each year while participating in water recreation, such as swimming or boating. Nearly half of these recreational drowning deaths (49 percent) are among children ages 5 to 14.[27]
- ***Adults must install multiple layers of protection around home pools and be consistent in using barriers that do exist.*** While 98 percent of pool- or spa-owning parents report they have taken adequate steps to ensure children's safety, most responses also reflect a lack of actual environmental modifications – nearly two-thirds (61 percent) of pool- and spa-owning parents have no isolation fencing, and 43 percent have no self-closing and self-latching gate.

- ***Adults must increase the quality of their supervision of children around water, as nearly 9 in 10 deaths reviewed occurred while the child was being supervised.*** While nearly all parents said they always actively supervise their children while swimming, parents also admit to participating in a variety of distracting behaviors while supervising.
- ***Caregivers need to enforce the consistent use of PFDs in potentially hazardous situations.*** Many tweens admit that they never wear a PFD when riding a personal watercraft (50 percent), participating in water sports (37 percent) or on a boat (16 percent). While parents recognize the importance of PFD use, they do not always require their children to wear PFDs or model safe behavior for their children.
- ***More children should be enrolled in swimming lessons taught by a certified swimming instructor.*** Although the majority of parents (82 percent) agree that all children should take swimming lessons by age 8, 37 percent of parents of children ages 5 to 14 report that their child has never taken swimming lessons.

Anna Plotkin
Alicia Kula

Drowning Prevention Coalition of Palm Beach County
50 S. Military Trail, Suite 101
West Palm Beach, Fl. 33415-3198
(561) 616-7068 • Fax: (561) 616-7082
www.pbcgov.com/dpc

SWIMMING POOL HEARING

Presentation made to the Consumer Product Safety Commission
Public Field Hearing Concerning Swimming Pool Safety
Monday, June 21, 2004 Tampa, Florida

Presenters: Anna Plotkin, Drowning Prevention Coalition Coordinator
Alicia Kula, Drowning Prevention Coalition Specialist

Your Honors, Members of the CPSC Public Field Hearing Panel, Water Safety Professionals, Ladies and Gentlemen:

On behalf of the Drowning Prevention Coalition of Palm Beach County, Florida and its partnering agencies including the Home Safety Council, we would like to address swimming pool safety, specifically as it concerns our children 5 years of age and younger. The loss of any life to drowning is devastating and that is why the Drowning Prevention Coalition targets *Zero Drownings* with a partnership of stakeholders representing 30 organizations.

The Drowning Prevention Coalition was formally established in 1997, to promote, develop and support training and community education efforts that prevent drowning, near-drowning and other water related incidents in Palm Beach County. During that year, our County experienced 58 drownings. Last year, in 2003, there were 26 drownings, a 55.2 per cent reduction, while Palm Beach County's population increased by 16 per cent over that seven-year period. On a per capita basis, Palm Beach County reduced the numbers of drownings from 5.55 to 2.15 between 1997 and 2003. Specifically regarding children 5 years of age and under who drowned in pools or hot tubs, Palm Beach County had 9 fatalities in 1997 and 3 fatalities in 2003. This is a 66.7 per cent reduction, which has been consistent over six years, in spite of the population increase.

The Drowning Prevention Coalition has achieved this reduction in the numbers of drownings because of a comprehensive program of awareness and education, skills training, distribution of safety interventions and encouraging legislative action.

Some proactive measures that comprise our program, and which we would like to recommend to this panel include the following:

The Palm Beach County Drowning Prevention Coalition is collaboratively supported by: the Palm Beach County Board of County Commissioners, Children's Services Council of Palm Beach County, the Palm Beach County Health Care District, Palm Beach County Fire Rescue and the Quantum Foundation.

Raising public awareness and education, for example

- Water safety classes in schools, summer camps and safety fairs, advertising via billboards, print and audio visual media, as well as the production of a drowning prevention show aired on cable TV
- Drowning prevention presentations at various community associations, including centers targeting speakers of other languages
- Media advisories, Press conferences, Proclamations and networking opportunities with water safety stakeholders

Skills training such as:

- Providing Drowning Prevention "Bucks" a voucher system for free swimming lessons to qualified families used at many pools throughout Palm Beach County
- Establishing swimming lesson scholarships for at risk youth, as well as Lifeguard Training and Water Safety Instructor training. These programs are funded by DPC Coalition partners: American Red Cross, Childrens Services Council, the Quantum Foundation, Pahokee Fire Rescue, Palm Beach County Fire Rescue and the US Fire Administration

Distributing safety materials and intervention devices such as:

- A DVD on water safety and the responsibility of pool ownership to homeowners building new pools
- Personal flotation devices, toilet lid locks, window, door and pool alarms
- Printed materials on layers of protection

Encouraging legislative action such as:

- A local Palm Beach County building ordinance 94-7 adopted April 19, 1994 requiring safety measures on new residential swimming pools including four-sided pool fencing, which has since been superceded by the Florida Building Code
- Support by Commissioner Warren Newell and the Board of County Commissioners for the "Preston de Ibern/McKenzie Residential Swimming Pool Act". This originated as House Bill 25 and Senate Bill 86 and in 2000 became Florida Statute Chapter 515, known as the Residential Swimming Pool Act. It requires residential swimming pool safety features, pool barrier requirements, drowning prevention education programs, public information and information to buyers on drowning prevention and the responsibility of pool ownership
- The Florida Building Code enacted March 1, 2002, Chapter 424 Section 2, Private Swimming Pools includes section 2.6.6 on Entrapment Protection for Suction Inlets, as well as section 2.17 Residential Swimming Barrier Requirements

According to our Medical Examiners office, Palm Beach County has had no suction entrapment fatalities since the introduction of the Florida Building Code Chapter 424. However, regardless of age, race, gender or socioeconomic background, anyone can become a victim of drain related hazards. Prior to this legislation, one of our own Palm Beach County Firemedics found his son sucked to a spa drain. The force was so strong, that when he finally freed him, along came a chunk of concrete with the drain cover still attached to his stomach. Until this incident, this Firemedic was unaware of the dangers of pool and spa drains. Even in his emergency work, he had never heard of such a case.

One of the recommendations of the Home Safety Council is that *agencies responsible for injury data should examine how to improve the quality and completeness of data about injury.*[1] The Drowning Prevention Coalition concurs with this assessment and is now developing a new Incident Reporting form which will include a section on suction entrapment and entanglement, thus providing Palm Beach County with a more detailed account of each drowning and near-drowning incident.

---

1. Runyan CW, Casteel C (Eds.). The State of Home Safety in America: Facts about Unintentional Injuries in the Home, 2nd edition. Washington, D.C.: Home Safety Council, 2004.

John Brown

On August 21, 1988, James Keenan of the U.S. Consumer Product Safety Commission (CPSC) was quoted in the Ocala Star-Banner as saying that; "We've been trying to eliminate this problem for 15 years." Mr. Keenan was commenting on a spa drain suction entrapment that killed a 7-year old girl in her grandmother's backyard. If my calculations are correct, that means the CPSC has been aware of the unreasonable risk and injury pool and spa drains pose, since 1973.

Although the CPSC has had 31-years of tactical experience in preventing pool and spa drain suction entrapment, I would like to offer some suggestions it might consider in finally formulating a strategy to prevent this problem in the future.

1. Hire an advertising agency to develop and implement a professional consumer information program on pool and spa drain suction entrapment. Issuing a CPSC press release, sponsoring conferences and hearings, or recalling a product post-mortem has had virtually no impact on consumers. The CPSC, in cooperation with the National Pool and Spa Institute (NSPI) has been meeting and conferencing, and issuing warnings on pool and spa drain suction hazards since 1974. I refer you to Press Release 74-035 that specifically warned of spas with single drains and flat drain covers. Yet 28- years after this warning was issued a 7-year old girl from Fairfax County Virginia was killed in single drain spa with a flat drain cover. The CPSC Public Information System has been a failure in the critical function of alerting consumers about the hazards associated with swimming pool and spa drains.

2. Prepare and distribute a specific warning on pool and spa drain suction entrapment and send it, Registered Mail, to aquatic safety organizations like the Red Cross, YMCA, local Drowning Prevention Coalitions, as well a child safety groups like Safe Kids. Warn them about the hazards and ways to avoid the dangers associated with pool and spa drains. Currently, not one of these groups addresses the hazards associated with pool or spa drains in their literature, web-sites, or training programs. This is an obvious and simple thing that should have been done a long time ago.

3. Specifically train all CPSC field staff on pool and spa drain suction entrapment and how to prevent it. With the exception of a few people in Bethesda, commission awareness and understanding of this hazard is inadequate. As recently a March, at the International Consumer Product Health and Safety Organization Symposium, I spoke with CPSC field staff who had at best a vague understanding of this hazard. They were not even aware of the commission's own press releases on the subject.

4. Create one specific group within the commission that is exclusively responsible for preventing and eliminating all pool and spa hazards, including drain suction entrapment. This group should include staff with legal and engineering expertise and be charged with aggressively eliminating all known pool and spa hazards. 31-years of meetings, discussions, and so-called cooperative efforts have not worked. The lingering problem of pool and spa drain suction entrapment that has killed and injured children since 1973 must be stopped now.

Let me conclude by saying that I will urge the President and Congress to authorize a new Federal Activities Inventory Reform review of the CPSC and urge them to carefully consider the competitive outsourcing of the commissions public information functions.

FROM : FAX NO. : Oct. 22 2 **Alfred Flaherty**

C/O – ATTN FAX # 301 504-0127
MS Rocky Hammond

A Flaherty
468 Morning Dove
Plant City Fl 33565

This is my idea for a life saving device I call, "Canopy of life, a swimming pool cover

I want to list the benefits of this device

(1) – Easy on/off cover, about 10 seconds

(2) completely covers pools when not in use, and saves heating costs, overnight

(3) keeps dirt + trash out of pool during inclement weather, easy cleaning + filtering

(4) Peace of mind.. – can hold up to 150LBS - PLUS

(5) Optional, U.V. Protection on cover

(6) Can be made Decorative w/night light mounted on cover w/safety wiring.

(7) almost totally lightweight plastic - strong

(8) Child-proof safety switch, out of reach w/lock + key.

(9) back up device in case of snapped cable – being worked on.

Please remit my photos to me when finished with them –

Respectfully
A Flaherty

6-X-98

C/o Ms. Rocky Hammond

FAX
301-504-0127

The photos of the working model shows a very rough model, made from, scrap lumber, a spool + the leg of a lawn chair.

The actual canopy will be made of strong light weight plastic + the guide poles would be outside of pool lip.

The thickness of the cover would have to be determined by strength needed

Respectfully
Alfred J Flaherty

My home TEL #
(813) 719-7752

WINCHES ON VERY CRUDE model are in lieu of hydraulic operated boom - AJF

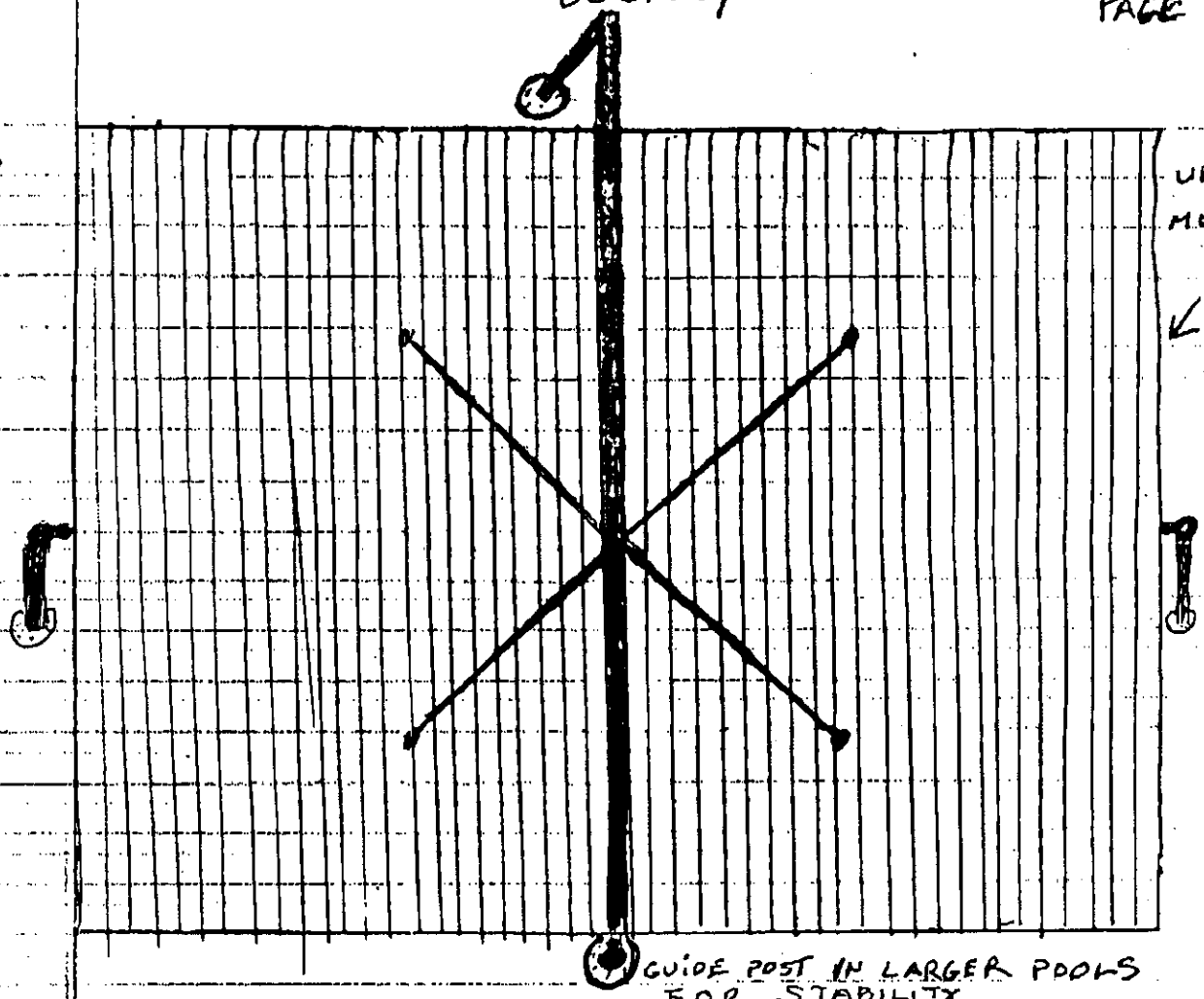
~~CONFIDENTIAL~~

BOOM W/CABLE

PAGE III

IG. II
ERHEAD
IEW

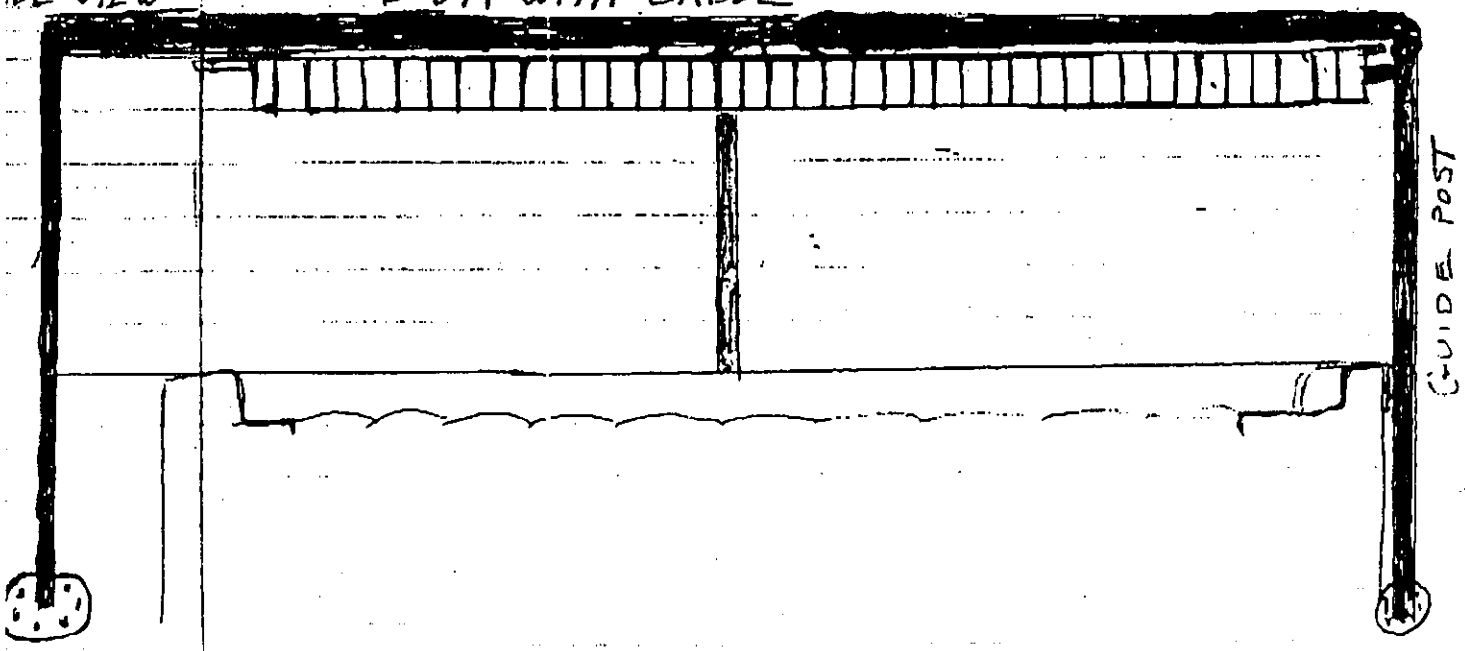
UP + DOL
MOVEABL
POOL
COVE
- PLAS



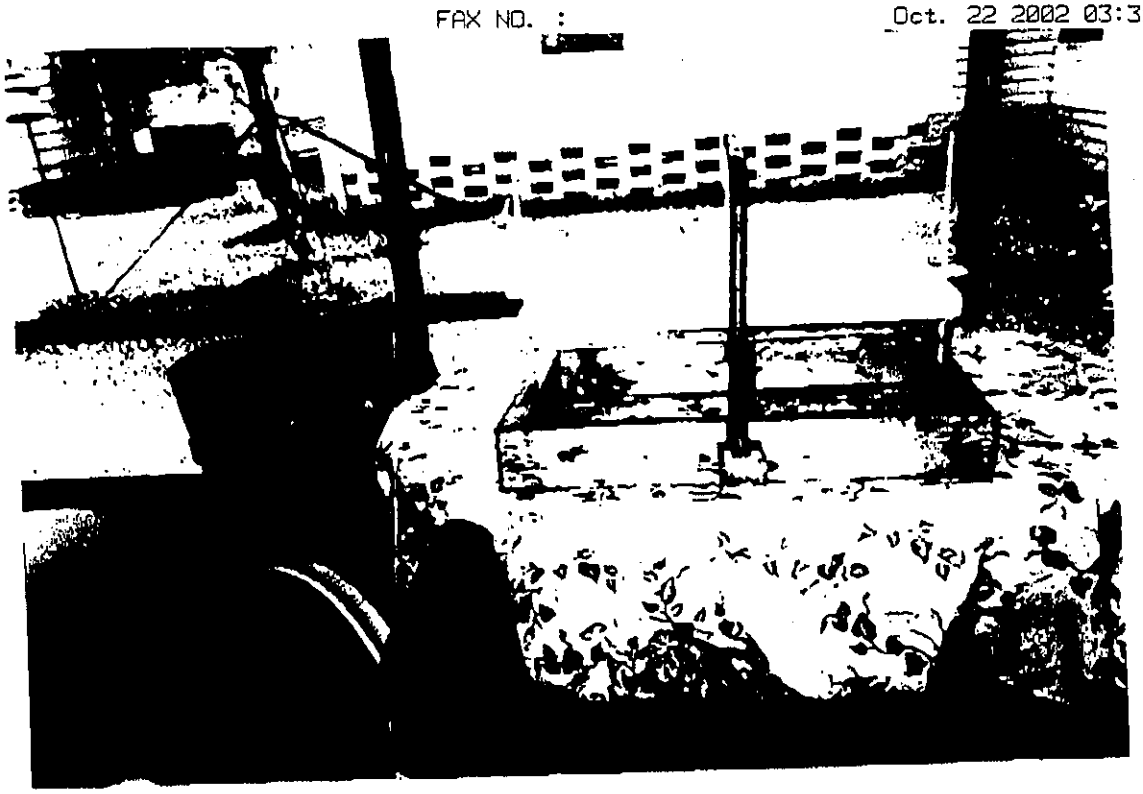
GUIDE POST IN LARGER POOLS FOR STABILITY

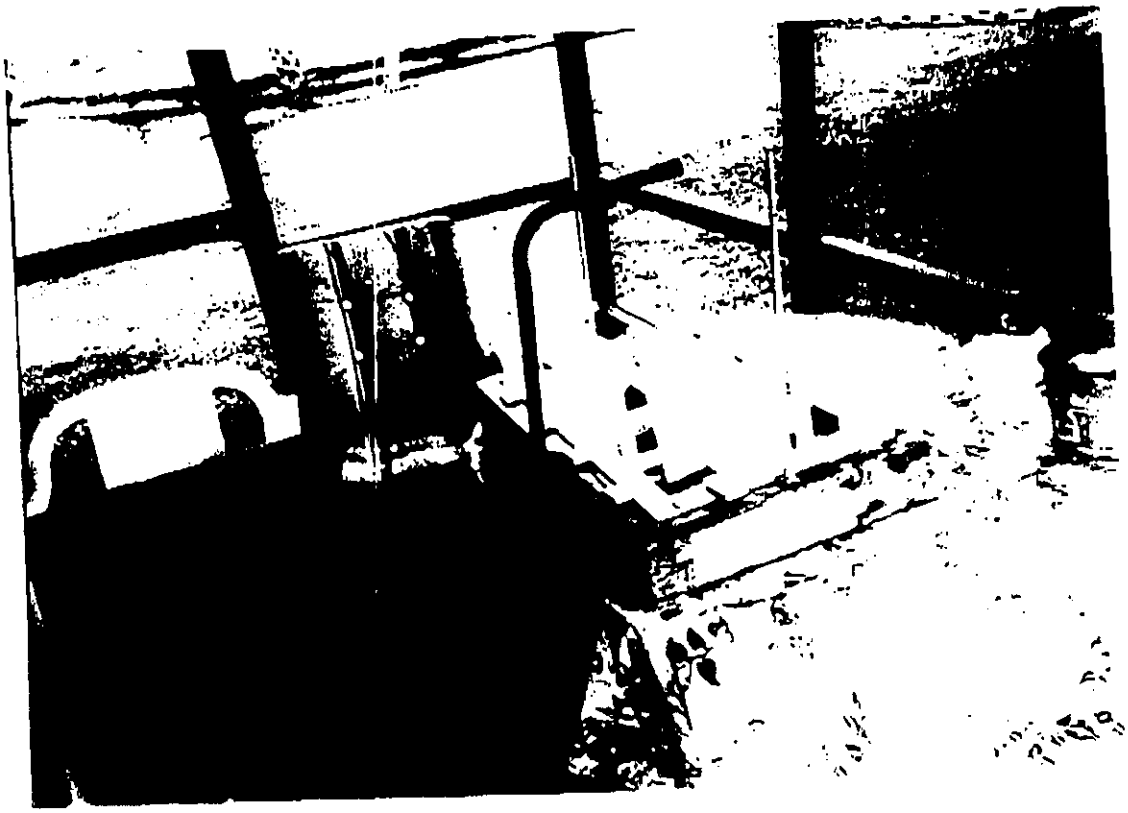
IG III
IDE VIEW

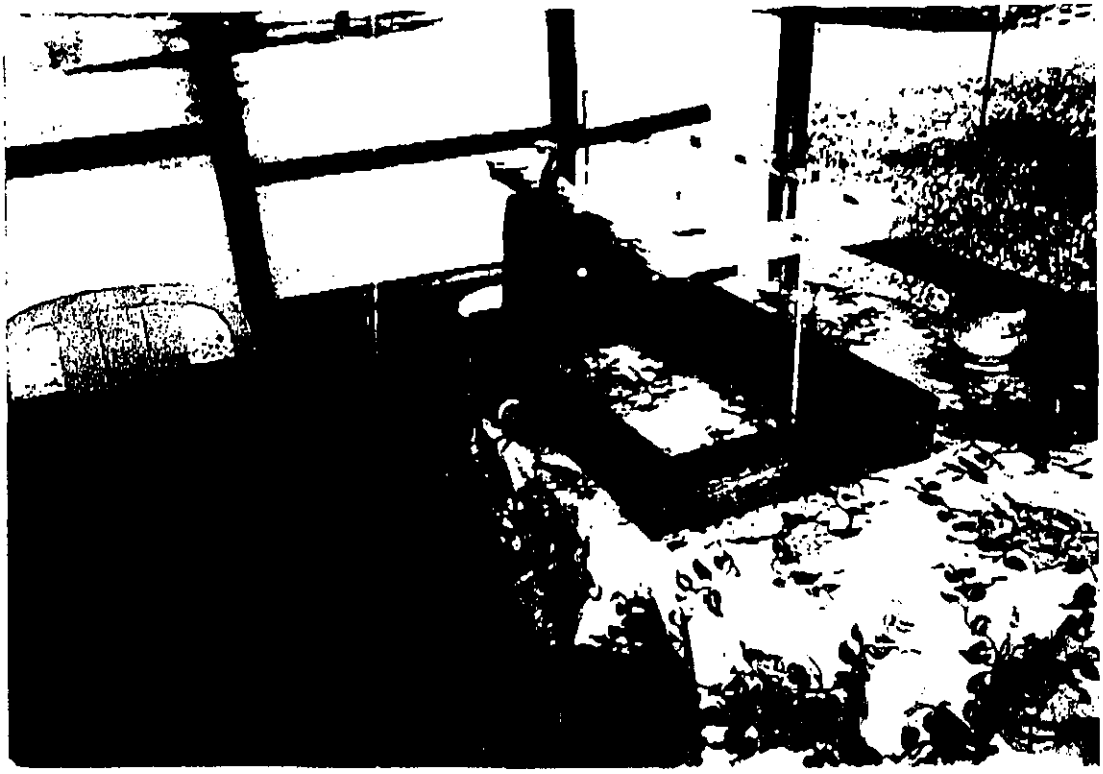
BOOM-WITH-CABLE



GUIDE POST







Gary Duren

SWIMMING POOL SAFETY –

A MODEL CODE AND STANDARDS DEVELOPMENT PERSPECTIVE

Have you ever stopped to think about the great spirit of volunteerism in the good ole USA? Consider Little League Baseball, Pop Warner Football, Youth Soccer, Basketball, Hockey and so on. These great institutions contribute countless benefits to our society and largely run and administered by volunteers! It is hard to imagine American life without such venerable establishments. At the local level moms, dads and others give up many hours so that kids can experience real physical education, fitness all coupled with such noble concepts as team work, good sportsmanship and fair play.

One has a hard time coming up with any rivals to the level of volunteerism found in organized youth sports, however, in light of the recent consolidation of the three regional code official associations (BOCA ICBO and SBCCI) into International Code Council (ICC) the ICC stands out as being one notable example. This is especially true since all of the code change committee members covering the various code disciplines, building-structural, building-fire, mechanical, plumbing, swimming pools, etc. are composed of volunteers from around the nation. Other organizations, such as IAPMO, ASHRAE, ASTM, ASME and NFPA also depend on volunteers for their existence.

If asked ten years ago; would there ever be a coast-to-coast model building code, much less a plumbing or mechanical code? The answer would have likely been, "not in our life-time". When looking at the current state of model codes available in the US, it becomes clear that writing a true national model for any of the code-disciplines is a monumental undertaking. However, the I-Codes are now reality and most authorities having jurisdiction around the US are beginning to utilize the I-Code models as the basis for their individual building regulations.

Remember - the entire ICC code development process is totally dependant on its volunteer system. It is an outstanding example of how it really works when self-determination and self-government are left intact. We should all take some time to recognize and thank the volunteer participants. At the same time we should be very proud of all of those state and local governments, contractors, architects, engineers and plain ole individuals who have sacrificed their valuable time for the noble purpose of establishing and maintaining a coast to coast set of model codes.

How could all of this consolidation have occurred in such a relatively short time frame? It was due to three primary factors:

1. No One Wanted Big Brother in the Code Business

In the late eighties and early nineties it appeared that Big Brother was looking to get into the building code business. Everyone knows that having the Federal government write building codes is the last thing we wanted to see.

In November of 1989, President Bush (Sr.) announced his HOPE initiative, he asked HUD Secretary, Jack Kemp to appoint a blue-ribbon commission to study government regulations that drive up housing costs for American families. Acting on this request, Kemp created an Advisory Commission on Regulatory Barriers to Affordable Housing (See *"Not in My Back Yard" Removing Barriers to Affordable Housing – 1991)*

The recommendations from this group were in favor of keeping the Federal Government out of the code writing business and actually encouraged state and local adoption of the Council of American Building Officials (CABO) One and Two Family Dwelling Code.

At that time, the CABO code was the first stab at a coast to coast residential code and the first time in history that the three principal code promulgating bodies, BOCA, ICBO and SBCCI joined their forces towards the common goal of a coast to coast residential building code.

2. The Design Community, Architects and Engineers alike were strongly in favor of a uniform set of building regulations.

For obvious reasons, design professionals everywhere were sick and tired of differing building regulations between state and county boarders.

3. The National Association of Home Builders was strongly in favor of a uniform set of building regulations.

Once again the reasons are obvious as to why home builders would be supportive of such a concept as a uniform set of building regulations.

So in the mid nineties the climate and soil conditions were right and the CABO leadership had clear vision. They quickly seized the opportunity to move forward by establishing the ICC founding it on the noble idea of uniform "coast-to-coast" building codes. Finally we are there. Yaaaaaa!

BUT WAIT ONE MINUTE. Just when you thought it was safe to buy in to the coast-to-coast building code concept. Now NFPA, ASHRAE and IAPMO have thrown their hat into the ring and are hell bent on developing a competing set of coast-to-coast uniform codes. Ewwwwww!

Certainly no one would ever argue that the NFPA is the world leader in life safety and fire prevention standards. Similarly, no one would take exception with ASHRAE's leadership role in indoor air quality standards. IAPMO currently offers the best and fastest ticket in regard to getting new plumbing technologies on the street. IAPMO's visionary leadership has filled a huge void in the industry through their vision and applied its expertise in this area through the vehicle of Interim Guide Criteria (IGC) standards.

The IGC process allows manufacturers of new and innovative technologies the advantage of a streamlined standards development process that is currently unchallenged within the

industry. In addition, IAPMO is expanding its third party certification business for plumbing and mechanical products. In this area of the industry there is also quite a void. IAPMO is clearly stepping up to the plate. It is hoped that IAPMO will continue to expand these programs into the other code disciplines. The industry can really use some good ole competition in these crucial areas.

One cannot help but ask the question, "shouldn't all of these interests stick to their own respective strengths and quit posturing and fighting each other?"

While the momentum for the coast to coast building code is very strong; the actual benefit from uniform building regulations are far from being realized. States and local authorities having jurisdictions, on a national average lag at least three years behind the current model building codes. Some states have better building code review and implementation procedures than others.

One good example of how states happen to get behind the process of adopting current model codes can be seen here in the state of Florida. Florida is one of the more recent high profile states to jump on the "uniform statewide building code concept" bandwagon. When FL enacted this important legislative move, the I-Code consolidation process had not reached fruition.

So the uniform statewide codes in effect now in FL are actually based upon 1997 models. The only I-Codes available at the time FL moved to it statewide code were the plumbing and mechanical models. The net effect is that FL is now six years behind the current model code development clock. Most states and authorities having jurisdiction fall into this category. The reason for this lag, not only in FL but through-out the nation is partially based on the local political infrastructures and more particularly, budgetary and plain old logistical problems.

There is also the fact that the I-Code models were published based on a three year printing cycle. Most authorities having jurisdiction do not have the time, financial or personnel resources to adequately review annually based interim or supplemental codes. They generally conduct model code review processes that coincide with the three year model code publication cycle. The three year code publication cycle has had its benefits and its problems.

On the up side the benefits of an annual code change cycle were largely skewed towards the industry and those wanting to introduce new subject matter into the respective model code disciplines. One had three attempts to introduce modifications or new subject matter into the model codes before the publication of the revised code documents. This afforded code change proponent's ample time for considering feedback and ample opportunity to tweak code proposals over three annual cycles.

The down side was that the code promulgators had little time to collate, print and distribute supplemental codes. This meant that is was difficult to keep up with the intervening changes. This also proved logistically difficult for authorities having

jurisdiction or other interested parties to provide timely, meaningful, and intelligent input into the developmental process, since the code change deadlines were sometimes very close to the release date of the prior year's supplemental codes.

This quick turn-around policy left little time for due diligence and adequate consideration of the impact of new code provisions to occur, before the submittal deadlines. Due to the tight deadlines many state, regional, local code enforcement/administrator associations and other interested parties did not have time to distribute supplemental code update documents to the various code disciplines so that the respective code–discipline review committees could not effectively disseminate the information before the comment periods or code changes submittal deadlines had occurred.

In response to these logistical problems, the ICC leadership elected to move to an eighteen month code chance cycle. Now one has only two opportunities over three years to effect changes.

The new code change cycle will allow the I-Code staffers time to collate, print and distribute one supplemental or interim code during the three year cycle. This move affords interested parties much more time for thorough review of the impact of intervening changes within the various code disciplines. Additionally, the two shot verses three shot code change window of opportunity should help to curtail frivolous proposals. However, with only two shots, it may prove to become more difficult to introduce new subject matter. So we have to get it right the first time and keep it simple stupid.

To catch the ICC bullet train is not going to be an easy task. One cannot help but wonder why one would want to try considering the multiple industry segment benefits afforded via a uniform coast to coast set of model code regs? Could it be the profitability of selling code books? Could it be that competition is good in this area? Could it be that special interests want to continue exercising control over new technologies? You decide the reasons. The benefits of the coast to coast building code are innumerable. The ICC concept is here to stay. However, it may be some time before the true benefits of a coast to coast code are realized in your locale.

Swimming pool safety measures are included in the I-Code models. These measures pertain to barriers and anti-entrapment measures. These code provisions are based on the Consumer Product Safety Commissions *Guidelines for Entrapment Hazards: Making Pools and Spas Safer, Publication Number 363 009801 circa 1998*. This publication was written to assist national, state and local code promulgators, national, state and local Health officials and state and local buildings officials understand the means of mitigation for this safety hazard.

The general recommendations of this publication have also been referred to as "Three Layer of Protection" and can be reduced as follows:

1. Suction fittings used in pools and spas must be of the type that either conform to ASME A112.19.8 or because of their geometry, mitigate the risk of entrapment.

2. The pool circulation system should be provided with a minimum of 2 drains (suction outlets) per pump.

3. The pool circulation shall be provided with a secondary back-up system which vents to atmosphere, or shuts down the pump or reverses circulating flow when a blockage is detected.

There *is* a standard that addresses performance and safety requirement for a class of pre-manufactured technology that each of which entirely eliminates the source energy from the entire circulating system by either vents to atmosphere, or shuts down the pump or reverses circulating flow when a blockage is detected. The Codes now incorporated a referenced to this important standard. ASME A112.19.17, "*Safety Vacuum Release Systems For Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction Systems*".

The intent of requiring "a secondary back-up system" is to require a means for completely removing the source of energy from the *system* in the event of a body or limb entrapment occurs. The circulating pump in the system constitutes the energy source. Unless this dangerous energy is disengaged at its source and the resulting energy thereby removed from the system, the potential for injury that can and has caused the loss of life still exists at the outlet.

Since the model codes have incorporated requirements that mirror the 1998 CPSC Guidelines new construction pools are much safer now. The CPSC should now consider placing an emphasis on retrofitting existing pools that do not meet the current code mandates. Some estimates indicate that there may be millions of existing pools or pool and spas combinations that are death traps waiting to happen. Possibly this important issue can be address by coordination with the varying state Public Service Commissions to have their help in getting the public awareness into the equation.

In conclusion the CPSC must be commended for its work in making pools safer. Only one questions remains. Are you all doing your part to make all pools safer?

CIRRICULUM VITAE

Gary S. Duren
6812 Camp Road
Keystone Heights, FL 32656
352/473-0195
352/473-1080 (Fax)
E-mail: garyduren@AOL.com

PERSONAL

Age: 45, Happily married for 20 years father of 3 sons, ages 16, 14, and 12. Secretary of Melrose Lodge # 89 F. & A. M.

In 1992 founded Code Compliance Incorporated in order to:
provide consultation regarding new product code, standards and marketing development.
provide consultation regarding building code interpretations;
formulate apparatus on behalf of manufacturers;
provide assistance to local municipalities in developing codes and ordinances;
establish product compliance pursuant to building codes and national standards;
represent the general public regarding property and zoning appeals;
proffer expert witness testimony in plumbing-code-related matters; and
provide plumbing design services;

WORK HISTORY

1981-1988 Vice President/Partner of LW Duren Sales Agency, Inc. Covered Florida promoting sales for manufacturers within the plumbing industry, such as, WATCO Manufacturing Company, JC Whitlam, Bridgeport Brass, and MCC Powers Process controls (a major manufacturer of water tempering control devices) specialized in assisting architects and engineers in the design and specification of hot-water safety systems.

1991-1994 Member of Board of Directors, Region Five, of the American Society of Sanitary Engineering (ASSE).

1988-1992 Retained by Studor in 1988 for the purpose of distributing air admittance valves manufactured by Studor Trading, LTD, Gibraltar. Served from company's inception as executive Vice President, directly responsible for developing a standard for this new technology, and for drafting regulatory verbiage for adoption into the model codes. Developed a marketing plan, advertising, literature, video production materials, set-up a national sales network. Responsible general business administration. Eventually promoted to the office of President in 1990, and served in that capacity until resignation in late 1992.

ASSOCIATIONS

Member of the University of Florida Center for Training, Research and Education for Environmental Occupations Advisory Board/Council **(TREEO Advisory Board)**

CIRRICULUM VITAE

Gary S. Duren
6812 Camp Road
Keystone Heights, FL 32656
352/473-0195
352/473-1080 (Fax)
E-mail: garyduren@AOL.com

Member of the American Society of Mechanical Engineers A112 Plumbing Materials and Equipment [Standards] Committee (**ASME A112 Main Committee**)

Project Team Leader/Chairman Safety Vacuum Release Systems for Pools and Spas (**PT Chairman A112.19.17**)

Member of the Florida Building Commission, Plumbing and Gas Technical Advisory Committee (Governor Chiles/Bush Appointment) (**FBC Plumbing and Gas TAC**)

Secretary American Society of Refrigeration, Heating Air Conditioning Engineers Technical Committee 7.5 (**ASHRAE TC 7.5**)

Member of the Florida Association of Plumbing Gas and Mechanical Inspectors Board of Directors (**FAPGMI Ambassador of Goodwill**)

Chairman of FAPGMI Inspectors and Manufacturers Advisory Committee (**IMAC Chairman**)

Member of International Association of Plumbing and Mechanical Officials (**IAPMO**)

Code Columnist for the publication, *Plumbing Engineering*

Member of the **Florida Department of Environmental Protection,** Mike Roess Gold Head Branch State Park, Management, Planning and Use Advisory Committee

AFFILIATIONS

International Code Council (**ICC**)

American Society of Plumbing Engineers (**APSE**)

American Society of Heating, Refrigeration and Air-Conditioning Engineers (**ASHRAE**)

Georgia State Association of Plumbing, Gas and Mechanical Inspectors Association (**GSPGMIA**)

Alabama Association of Plumbing, Gas and Mechanical Inspectors (**AAPGMI**)

North Carolina Plumbing Inspectors Association (**NCPIA**)

CIRRICULUM VITAE

Gary S. Duren
6812 Camp Road
Keystone Heights, FL 32656
352/473-0195
352/473-1080 (Fax)
E-mail: garyduren@AOL.com

Texas State Plumbing Inspectors Association (**TSPIA**)

Virginia State Plumbing Inspectors Association (**VSPIA**)

TECHNOLOGICAL ACHIEVEMENTS

Inventor - U.S. Patent Re. 35,532 - First American to disclose an Air Admittance Valve for plumbing drainage vent systems for eliminating plumbing vent pipes from penetrating the roof and building structural components.

Inventor – US 5,971,014 - Vacuum Breaker Valve Vent Fitting Clean-out Device for Plumbing drainage systems.

Prepared "Background and History of Air Admittance Valves" for the Florida Building Code and Standards, Plumbing and Mechanical Committee

Appointed (Florida Governor Chiles) as a member of the Florida Governor's Building Code Commission Manufacturer's Panel

Prepared initial draft standards ASSE 1050 and ASSE 1051, for air admittance valves for plumbing drainage systems. In August of 1988 requested that ASSE develop a standard based on said draft. Served then as a member of the ASSE Working Group for these two new standards. These documents relate to air admittance valve technology and have hence been published and issued as standards by ASSE. ASSE 1051 is an American National Standards Institute (ANSI) accredited document.

Authored Section 905.7 of the Standard Plumbing Code, "Air Admittance Valves for Venting Plumbing Fixtures and Fixture Branches. Authored Section P-1808 Air Admittance Valves in the 1993 BOCA National Plumbing Code as well as modifying P-907.1, Chapter 9, Vents and Venting; Authored similar Vents and Venting sections of the CABO One and Two Family Dwelling Code pertaining to air admittance valve technology; thus pioneering code acceptability of air admittance valve (aav) technology in the United States. The aav-venting section of the International Code Council's (ICC) International Plumbing Code (IPC) is based upon the initial work above referenced.

Authored subsection 1002.3 of the International Mechanical Code thus permitting supplemental water heating devices to be installed in jurisdictions where the IMC is the code.

CIRRICULUM VITAE

Gary S. Duren
6812 Camp Road
Keystone Heights, FL 32656
352/473-0195
352/473-1080 (Fax)
E-mail: garyduren@AOL.com

Prepared initial draft ASHRAE standard for Methods of Testing and Rating Passive Heat Pipe Dehumidification Enhancement Equipment utilized within HVAC Systems. This document is pending approval and publication as an ASHRAE standard.

Principal organizer and underwriter of the "Water Is Life Seminar", as recognized by Florida Governor Martinez. This seminar was held during March of 1990, during my term as President, of the West Coast Florida Chapter of the ASSE. The seminar was held to bring regulatory, user, legislative and provider interest groups together. The purpose was to educate each participant regarding the fragile nature of our water supply, and collectively, how to best protect it for future generations.

Authored Chapter 10 "Interceptors and Seperators" revisions to the International Plumbing Code, Florida Minimum Plumbing Code and similar revisions to the Massachusetts State Plumbing Code.

Authored Section 3109.5 in the International Building Code (**IBC**) and Appendix AG 106 of the International Residential Code (**IRC**) entitled "Entrapment Protection for Swimming Pool and Spa Suction Systems", thus incorporating important safety measures based upon the US Consumer product Safety Commission publication entitled, *Guidelines for Entrapment Hazards: Making Pools and Spas Safer, Publication Number 363 009801 circa 1998*

REFERENCES

AVAILABLE UPON REQUEST