Prevention Advisor

News That Aquatic Professionals Need To Know

An Introduction To a CPO® Reference Library

Collection 2

Issue 11 through Issue 20

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Issue 11, February 2009

Quick Hits

All-New for 2009!
The 2009 Edition of the NSPF® Pool & Spa Operator™ Handbook is now available! Click here!

Give your health inspector reason to smile this season with the All-Weather Pool & Spa Log!

Stay up-to-date with the Crypto Toolkit at www.nspf.org!

The Model Aquatic Health Code (MAHC) committee members need your comments!

In the United States, all pool codes are reviewed and approved by state and/or local public health officials. There are no uniform national standards governing design, construction, operation, and maintenance of swimming pools and other recreational water venues. Thus, the code requirements for preventing and responding to drowning, suction entrapment, chemical exposure and injury can vary significantly among local and state agencies. A model national code would ensure that the best available standards and practices for protecting public health are available for adoption by state and local agencies. It is intended as a model aquatic code that state and local health agencies can adopt in part or in full as code regulations for their jurisdiction.

The Model Aquatic Health Code is hosted by the Centers for Disease Control and Prevention (CDC). Why? The CDC has taken on this role because, as of 2008, no U.S. federal agency has oversight over disinfected public swimming venues.

The CDC has posted three new documents for public comment on the Healthy Swimming website. These modules are the first of many modules being developed by volunteer experts. It's important to provide them help to get the best code possible with input from aquatic facilities, health departments, manufacturers, suppliers, and academia.

Document 1:
These modules include the MAHC Preface, guidelines for MAHC use, and an initial list of definitions to be used with the MAHC. Suggestions for further terms/definitions to be added are welcome. Click **here**.

Document 2:
This annex contains explanations and references supporting the Fecal/ Vomit /Blood Contamination Response module. Click **here**.

Document 3:
This module covers response guidelines for disinfection of water and surfaces following contamination with feces, vomit or blood. Click **here**.

Purpose

The purpose of the MAHC is to promote safe and healthy recreational water experiences for users of disinfected water venues in the United States. The final product will be a scientifically based model code that is national in scope, data driven, user-friendly, updated on a continuous basis, and includes input from all sectors and levels of public health, all segments of the aquatics industry, and the general public.

Process

In a departure from traditional code development methodology, the MAHC process will add drafts of additional modules to this web site as they are completed, rather than waiting until the entire project is finished. The dynamic nature of the MAHC will allow it to be updated on a modular basis as future technology and research data warrant. This approach will provide the latest recommendations to all audiences as quickly as possible starting with modules that are focused on outlining “generally accepted practices” and followed by improvements that will require further work and new data to support subsequent upgrades. All module material will first be posted in a draft form. Public comments will be solicited following the initial posting on the website.

Submitting Comments

Before the submission deadline, download and fill out the comment form (type directly into the form and save).

E-mail to MAHC@cdc.gov or mail to:

MAHC Coordinator, Water & Environment Activity
Centers for Disease Control and Prevention
Division of Parasitic Diseases, Mailstop F-22
4770 Buford Highway, NE
Atlanta, GA 30341

Comments must be submitted by Friday, March 13, 2009.

Volunteers

Technical committees are still being formed to address future modules. If you are committed, flexible, willing to help advance public health and aquatics, and would like to consider becoming a part of this exciting project, we invite you to fill out the nomination packet at http://www.cdc.gov/healthyswimming/MAHC/mahc_technical_comm.htm or contact CDC at MAHC@cdc.gov for additional information.

For more information about the Model Aquatic Health Code, go to http://www.cdc.gov/healthyswimming/MAHC/model_code.htm

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Issue 12, March 2009

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Information is Power!

What's keeping you from subscribing to these valuable resources?

Over the winter season, we have had at least three organizations approach us about "Safety Month" or "Prevention Week" type programs. We applaud organizations that feature safety and prevention topics as we approach the recreational water season - often called "summer." The reality for NSPF, and for professionals who operate public pools and spas, is that every day is "Safety Day." Therefore, it is important that you take a little time each year to keep yourself sharp, aware, and prepared to prevent drowning, recreational water illness, chemical accidents, injuries, suction entrapment, damage to your facility, etc.

This Prevention Advisor summarizes some valuable resources to help make learning a year-round, "every-day" thing for you. There are many trade publications and membership organizations that publish safety articles. To view a listing of these organizations and publications click here.

You will find links to a few articles published recently that might be of interest to you. Consider subscribing to benefit from the valuable information they share. Also, consider joining a trade organization or other group that can keep you aware of key safety information and other topics.

Note: *The articles below are dated materials and could be removed from the publication's web site at any time as newer content becomes available.*

Electrolytic Chlorine Generators
Park & Recreation Business
January, 2009

VGB Act Provokes Unintended Consequences
Pool & Spa News
March 13, 2009

Pool & Spa Safety Law Aimed at Preventing Drain Entrapments of Children Went Into Effect December 19

The IPSSAN
January, 2009

Cryptosporidium Oocyst Properties & Control with Swim Diapers & Filters (video)

James Amburgey, Ph.D., UNC-Charlotte
World Aquatic Health Conf. 2008

Outbreak Survival Guide

Recreation Management
March, 2009

Question the Expert

Pool & Spa Marketing
December, 2008

Seeing the Threat

Aquatics International
March, 2009

Winning Formulas

Athletic Business
March, 2009

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National Recreational Water Illness Prevention Week

The week before Memorial Day (May 18–24, 2009) has been designated as National Recreational Water Illness Prevention Week. The goal of this observance is to raise awareness about healthy swimming behaviors, including ways to prevent recreational water illnesses (RWIs) and injuries. RWIs are illnesses spread by swallowing, breathing in vapors of, or having contact with contaminated water in swimming pools, water parks, spas, interactive fountains, lakes, rivers, or oceans. Injuries at aquatics facilities can occur in or out of the water.

This year's RWI Prevention Week theme: pool chemical injuries

The theme for this year's RWI Prevention Week focuses on injuries associated with pool chemicals. Pool chemicals make the water where we swim safer by protecting us from germs; however, these same chemicals can also cause injuries if they are not properly handled. This type of preventable injury leads to thousands of emergency room visits each year. Public pool operators can protect themselves and swimmers by taking these key steps:

- ALWAYS secure pool chemicals: Keep children and animals away.
- ALWAYS read product name and manufacturer's directions before each use.
- ALWAYS use appropriate protective gear, such as safety glasses and gloves, when handling pool chemicals.
- NEVER mix chlorine products with each other, acid, or other substances.

To access a complete set of prevention recommendations, visit www.nspf.org

Free laminated pool chemical safety poster will be available soon.

Healthy swimming brochures can be downloaded in English and Spanish for free at www.nspf.org/posters.html

If you do not have an access to a color printer you can order them at www.cdc.gov/healthyswimming/brochure.htm

We encourage pool operators to adopt and promote this observance!

Additional online education on chemical safety can be found at www.nspf.org/Occupational.html

Courses are offered on Personal Protective Equipment (PPE), chlorine, chemical, and flammable liquid safety.

Additional information about Recreational Water Illness Prevention Week 2009 can be found at www.cdc.gov/healthyswimming

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Issue 14, May/June 2009

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Valuable Resources & Links

There are valuable new resources available to understand risks and to provide a safer aquatic environment for your patrons. Please, check out these resources now that your pool is open.

To be notified if the CDC and NSPF become aware of an outbreak in your region, sign up for the Outbreak Alert today. If you are receiving this email, you don't have to sign up as you are already on the list. However, please encourage coworkers or colleagues to sign up by clicking here. Review documents on the Crypto Prevention Tool Kit page for information to help prevent crypto outbreaks that are most common in the mid- to late-summer.

In addition, there are fact sheets and resource links on many topics including lightning safety, flood/catastrophic event pool maintenance, etc. located on the NSPF website, click here for more info.

New Reports from CPSC

There is a lot of confusion about drowning and entrapment statistics. This makes implementing prevention strategies less effective. The Consumer Product Safety Commission (CPSC) has released new reports in May 2009 providing info on where and how drowning and Suction Entrapment occurs.

Drowning Report

- "There were about 3,100 pool and spa related emergency department (ED) treated submersion injuries each year from 2006 to 2008 for children less than five years old.
- "There were about 295 pool and spa related fatalities per year from 2004-2006 for children younger than five years of age.
- Seventy nine percent of the fatalities of children younger than five between 2004 and 2006 occurred at residences.

To learn more click here.

Suction Entrapment Report

- From 1999-2008, CPSC staff is aware of 83 reports of circulation entrapments including 11 fatalities, 69 injuries, and 3 no injury incidents related to pools, spas, and whirlpool tubs. Of the 73 reports that mention location, 36% occurred at public locations while 64% were at residences.

For the full report, click here.

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Issue 15, July 2009

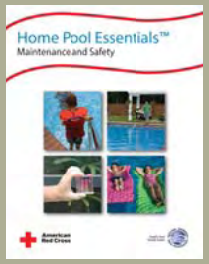
Quick Hits

Make your plans now to join us in Atlanta for the 2009 World Aquatic Health™ Conference. Click here for more info.

World Aquatic Health™ Conference

Learn how to identify, analyze, and reduce risk and exposure to loss with the Aquatic Risk Management book.

Maintenance and safety is made easier for home pool and hot tub owners with the new Home Pool Essentials™ online course from NSPF and the American Red Cross.



CPSC Request for Public Comment

The Consumer Product Safety Commission (CPSC) is asking for public comments on drafted technical guidance for unblockable drains and unblockable drain covers. We strongly encourage you to review this information and comment at your earliest convenience. **The deadline is August 5, 2009.** You can find this and other CPSC interpretations on our web page: http://www.nspf.org/FPSSA.html. If there are questions with the intent of this proposed language, we advise you to address those questions in your public comment. .

We have posted the letter from the CPSC below:

July 17, 2009

To the pool and spa safety community:

Topic: Unblockable Drains and The Virginia Graeme Baker Pool and Spa Safety Act

CPSC staff has drafted technical guidance and a technical memo regarding unblockable drains and unblockable drain covers and the Virginia Graeme Baker Pool and Spa Safety Act. CPSC staff is seeking public comment on the issue.

Open the documents below to review the guidance and get instructions for submitting comments.

- Staff Technical Guidance on Unblockable Drains: http://www.poolsafety.gov/unblockable.pdf
- Memorandum on Unblockable Drains: http://www.poolsafety.gov/unblockdrain.pdf

The deadline for submitting comments is **August 5, 2009**.

Thank you,

Kathleen Reilly
Office of Public Affairs
Consumer Product Safety Commission
www.PoolSafety.com

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Issue 16, August 2009

Quick Hits

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World Aquatic Health™ Conference

Learning at your fingertips.
Online pool operator training for operators and service/retail professionals.

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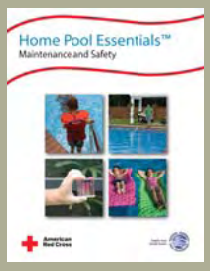

Revenge of the Algae!

As summer nears its end, water temperatures are higher and people will have more water problems. For CPO® certified professionals servicing commercial or residential pools, it is important to review fundamentals: maintain proper disinfectant levels, pH and water balance.

We are also at a higher risk this time of year due to algae. Environmental conditions such as light and temperature are important to support algae growth. Algae contributes to increased risk in several ways. First, it is a slip and fall hazard. In addition, algae may harbor bacteria increasing the risk of Recreational Water Illness (RWI).

Algae causes cloudy water and can increase risk of drowning.

Algae can also increase the risk of drowning for the following reasons: Algae on the pool bottom, especially at transition points from deep to shallow water, may challenge weak or distressed swimmers.

Algae can cause the water to be cloudy, increasing risk of collisions, injuries, and hiding swimmers in distress.

It is very important that algae is controlled to minimize the risk of illness or injury. Keeping water free of algae is more important than merely maintaining sparkling clear water. Information on algae prevention and other important maintenance topics can be found in the NSPF Pool & Spa Operator™ Handbook, the Pool Operator Primer™ online training course and via the Home Pool Essentials: Maintenance and Safety online training course.

Algae can be a maintenance and safety issue.

Either online course is an excellent resource for consumers, or even technicians to review the basics including algae prevention. For more information, go to www.nspf.org or www.HomePoolEssentials.org.

Preventing and Eliminating Algae

Algae are single-celled plants that present a major concern for pool owners and operators. Though algae is aesthetically unattractive, it also increases slips and falls and cloudy water hazards.

The pool operator has little or no control over the environmental factors that influence the growth of algae. Sunlight, outside temperature, and humidity are facts of nature. Algae spores are carried by the wind and there are thousands of species of algae that can contaminate and grow in a pool. Algae may even be present in the source water used for fill purposes. Some algae species have the ability to reproduce rapidly, turning a clear pool to green in less than a day.

Algae are most commonly grouped by color into three groups: green, black and yellow (sometimes called mustard). Green algaes are by far the most common and the most easily controlled. Black algae are usually found growing on pool walls in areas of poor circulation, such as the deep corners of the pool. Yellow algae, which is sometimes difficult to control, often require treatment with a specifically formulated algicide.

The nutrients can be controlled to some degree by insisting that users shower before entering the pool, especially for the removal of suntan lotions. The risk of having an algae bloom is reduced dramatically if the disinfectant and pH are maintained at proper levels. Operating factors such as proper filtration, circulation flow, and elimination of dead spots can help prevent algae. Also, routine superchlorination and use of an algicide are useful tools in the prevention of algae growth. An algicide is a good second level of protection if the disinfectant ever gets low. Brushing the pool/spa walls on a routine basis is an important preventative measure as well.

Once algae start to grow, they will rapidly consume the chlorine, promoting further algae growth (blooming). Therefore, prevention is the key. Fortunately, there are many effective algae prevention products and algicides to kill algae once it starts growing. Your local pool chemical store or service company can help you select the correct chemicals for your pool. When selecting an algicide be aware that some algicides cause foaming. If you have an attached hot tub that agitates and aerates the water, foaming can become worse.

Now that water temperatures are warm and kids are getting some late summer swimming, remember to keep diligent and brush up on the fundamentals. Keep the water chemistry good and prevent algae growth with proper disinfection, water balance control, and preventative measures.

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Quick Hits

Don't wait! Reserve a room! The **Hotel Registration Deadline** is **Oct. 7**! Join us in Atlanta for the 2009 World Aquatic Health™ Conference. Click here for more info.

World Aquatic Health™ Conference

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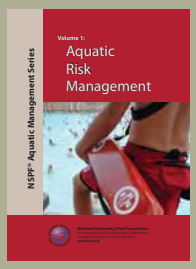
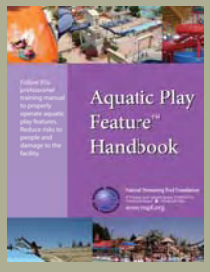


Aquatic Play Feature online training course! Click here!



CPSC Inspecting Pools

The Consumer Product Safety Commission (CPSC) has begun inspecting pools in multiple locations throughout the U.S. We encourage you to have your compliance certificates (from the drain manufacturer), certificates from an engineer (if applicable), receipts, invoices and other documentation that shows compliance available. If your pool is not in compliance but you are working toward compliance, provide documentation to that effect. We have not heard of CPSC closing non compliant pools, however, CPSC is sending notices of non compliance to the facility requesting the pool stop operation until it is brought into compliance with VGBA. For additional VGB information, log on to: http://www.nspf.org/FPSSA.html.

Pool Facility Winterization

A good winterizing program prevents damage to the pool surfaces, equipment, and the buildings and grounds. Careful winterization will:

- Prevent damage caused by hydrostatic pressure
- Prevent rust and general wear
- Reduce the chance for vandalism
- Make it easier to open the pool in the spring by using checklists to disassemble inventory and store equipment

In some areas, mild temperatures make it possible to leave the water in a pool to circulate occasionally. In more extreme climates, the pool may be drained and the circulation system winterized by using compressed air to blow all water out of the pipes and by the use of an antifreeze to prevent freezing in the pipes. The antifreeze must be designed for special use in pools. Never use automotive antifreeze, which contains ingredients that are toxic.

Hydrostatic Pressure

Hydrostatic pressure on the pool shell can cause catastrophic damage to a pool's structure. In areas with high water tables, ground water exerts pressure on the underside of the pool shell. This pressure must be relieved or the water can force the shell to "float" out of the ground damaging the shell, deck, plumbing and possibly equipment.

A hydrostatic relief valve (or valves in a large pool) can relieve hydrostatic pressure when installed as directed by the manufacturer at the deepest part of the pool. The valve opens and allows water to flow into the pool and relieve the hydrostatic pressure.

Pool Covers

Often, operators keep the water in the pool during the off season. Several factors influence this decision: local regulations, off season staffing availability and knowledge level, weather, treatment equipment and automation, and availability and type of cover. A pool cover can control staining by keeping debris out. Not all covers are designed to prevent persons or animals from falling into the pool. Unauthorized access to the pool must be prevented.

Check with the cover manufacturer or literature to make sure that added chemicals do not void the cover's warranty. Low pH or superchlorination may damage some covers and void the warranty.

Deterioration

Damage to equipment and materials from poor water balance, rust, freezes, dampness, condensation, inclement weather, UV rays, vandalism, insects, and animal encroachment are some of the off-season problems. These factors can reduce the life and increase the cost of running a seasonal facility. Implementing controls to limit damage or deterioration during the off season is a good financial strategy. Preventative maintenance checklists from equipment operation manuals should be consulted. Storage in warm places can help prevent freezing/thaw damage.

In cold environments, special attention should be paid to all water lines to prevent freezes and bursting pipes. Blowing water out of lines with compressed air is a useful option. Consider plugging lines to prevent entry by animals, insects or debris.

Disassembling and Assembling

Outdoor furniture, plumbing, drinking fountains, clocks, speakers, light fixtures, cabinets, program and instructional equipment and other small equipment should be stored and secured indoors to prevent vandalism, theft or damage due to UV, weather or freeze/thaw. If indoor storage space is limited, items should be covered and secured using cables or other locking devices. The operator should compile an inventory of all items including their storage location. A checklist of steps and parts required to reassemble each item is a good time-saving idea. Secure all hardware for each item in small plastic bags and attached to the equipment to which it belongs. Store your records in a safe place to help make opening the facility easier and faster.

Pool Water Chemistry

Health codes have little or no requirements during the off season. The main concern during this period is to protect the pool from damage. Off season chemical treatments prevent algae growth and oxidize the small amounts of contaminants. The chemical demand in the winter will be low. Free chlorine, pH, and water balance should be maintained, although testing can be performed less frequently.

Utilities

It is important to decide if water, electricity and gas service should be turned off. The local utility companies can assist in making this decision. In some cases, it may be costly to shut down and restart utilities. These costs must be balanced against the cost of maintaining minimal services during the off season. Make sure that power is available for the operation of any needed equipment or security devices.

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Issue 18, January 2010

Quick Hits

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Don't miss out! Click here for more info!

Hear about RWI prevention from other experts!
Click here to buy video codes & watch seminars!

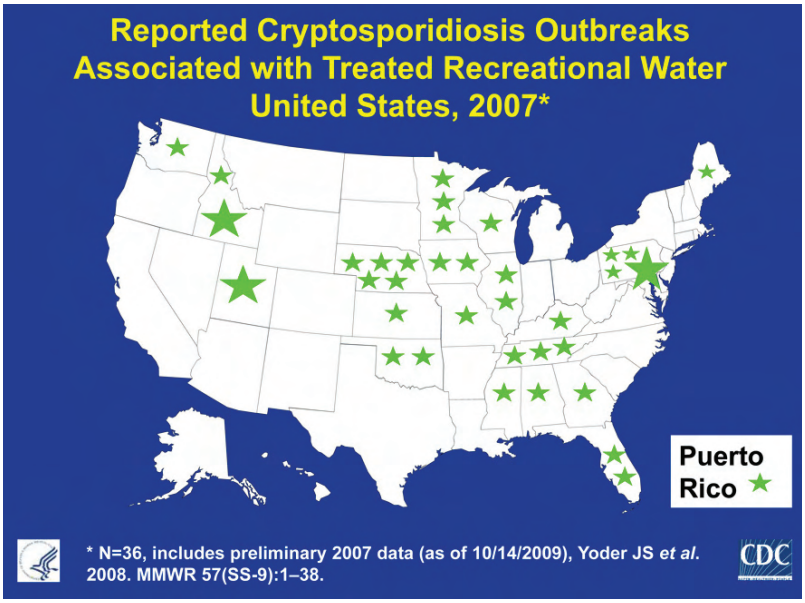
World Aquatic Health™ Conference

Ever had a chemical emergency?
Don't wait til one happens to learn what to do!
Click here!

Three State Programs that Helped Prevent Cryptosporidium Outbreaks: UT, PA & ID

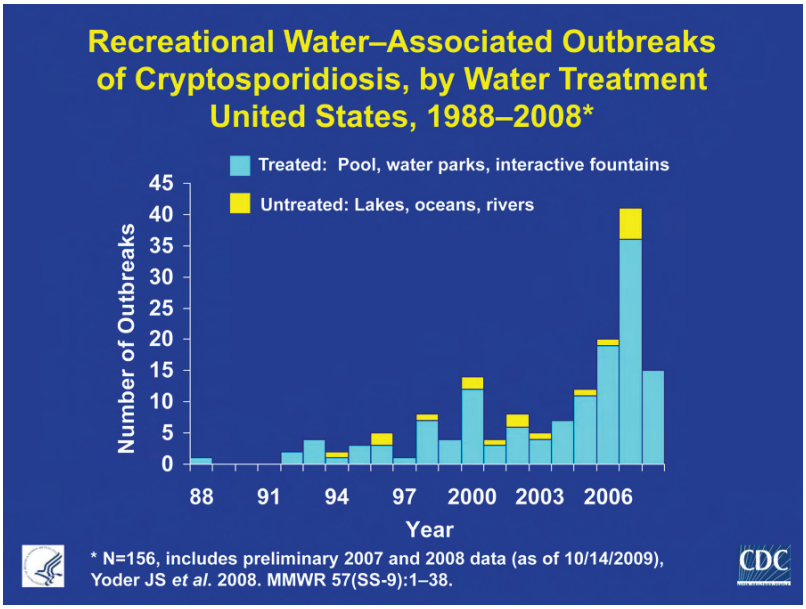
This is a summary of the 2009 WAHC Presentation by Michele Hlavsa, Chief, Healthy Swimming Program at the Centers for Disease Control & Prevention

The number of outbreaks that are associated with crypto in recreational water environments has increased:



This graph shows a decrease of outbreaks in 2008 but all the data had not come into the CDC at time of presentation. It is not conclusive.
(Click image for larger view)

In 2007, there was a significant increase in Crypto Outbreaks



The stars are not indicating a specific location where the outbreak occurred but merely the state it occurred in.
(Click image for larger view)

Outbreak in 2007 in Utah

A Utah county had an increased reporting of crypto cases in May/June, 2007. The county was already dealing with a non-recreational water outbreak. The Crypto outbreak developed into a statewide outbreak. Over 1,900 laboratory confirmed cases were identified. The UT Department of Health estimated that some 450 recreational water venues were contaminated during this outbreak.

This crypto outbreak started in recreational water. In the beginning, people reported swimming before they got sick and then people reporting being in contact with someone who was ill. Most cases occurred with children less than 5 years of age. In response, the local and state health departments, CDC and NSPF alerted the public, pool operators, and community partners. Before Labor Day, children less than 5 years of age were banned from swimming in public pools.

Banning Children from Swimming in Public Pools

Banning of children under 5 years old from swimming in public pools is a control measure that should only used in extreme cases and should not be used in small, limited outbreaks. The CDC could not verify how effective this measure was because it happened so late in the season. It is not clear if the outbreak subsided because pools were closing or because they banned children from swimming? There might be some negative public health consequences to having a ban like this. Indirectly, you might increase pediatric drowning rates because children are not learning their swimming skills.

In terms of enforceability, there were many issues. It was hard to inform all the pool operators, some parents were uncooperative, some pool owners were concerned about loss of revenue and there was some opposition from the public.

Measures taken before the 2008 swim season?

Before 2007, Salt Lake County saw about 5 cases of crypto per year. In 2007, they saw 684 outbreak related cases in this county. One third of the cases in the 2007 state-wide outbreak were in this one county. The county health department instituted the following changes:

- Switched disease-tracking system from weekly to daily reporting of positive results
- Started tracking the number of people who went to a health-care providers for diarrhea, those prescribed certain medications, sales of certain medications, and the number of diagnostic tests that were performed.
- Worked with other county health departments and the state so that everyone was on the same page.
- Created a crypto working group with community partners including epidemiologists, health care providers, chemical suppliers, pool operators, swim schools, HOAs.
- Invited other parties like pool operators to help them write their new code.
- Set up a crypto watch/warning system. If there was an increase in cases reported, facilities would post signs and they would take other measures if it developed into crypto warning.
- Pool inspections were reprioritized by ranking pools by risk of crypto contamination with community and interactive pools ranked first and then hotel and apartment pools ranked last.
- Media campaign was launched with a new website, TV and radio spots, press conferences, interviews, bi-lingual outreach, and newspaper inserts and articles.

Pool Owners implemented the following changes:

- Cleared pools every hour for 10 minutes to encourage people to take bathroom breaks
- Notified lifeguards to call in sick if they had diarrhea
- Provided test kits poolside
- Included crypto prevention information in membership contracts
- Posted chlorine levels

In 2008, there were only 8 cases reported. In 2007, it cost them $337,000 to control the outbreak. The 2008 control initiatives only cost $146,000.

In 2007, counties in Pennsylvania and Idaho also had large outbreaks. County health departments in both states implemented similar measures as the counties in Utah. They significantly reduced reported crypto cases in the 2008 swim season as a result.

Common Themes of Success

1. Communication between health departments, community partners, aquatic owners and operators, child care centers, and health care providers
2. Educating public via health officials, aquatics industry, CDC brochures, media campaigns, etc.
3. Regulation – modify pool codes and have aquatics sector and public health create the code together

Review the CDC Crypto Outbreak Response and Evaluation (CORE) Document and the NSPF Crypto Tool Kit for more information.

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Issue 19, February 2010

Quick Hits

Tell us what topics you want to see in the Prevention Advisor

Hear about other energy saving topics from the '09 WAHC!
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World Aquatic Health™ Conference

Alarms sound at your facility. Know what to do next?
Don't wait til one happens to learn what to do!
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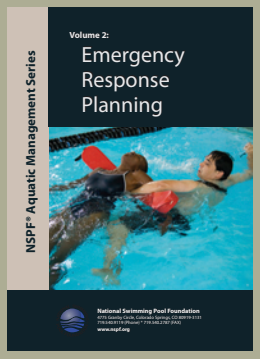

Energy Saving Strategies for Pool Operators

This is a summary of the 2009 WAHC presentation by Eric Utterson, President, 8760 Engineering, Inc. in St. Louis, MO.

Indoor pools/natatoriums are one of the most energy intensive buildings to maintain. An average building may use $1.50-$3.00 a square foot annually for energy and utility consumption. An indoor pool may use $8.00-$12.00 per square foot, a significant difference.

The systems that use energy in an indoor pool include:

- Mechanical systems from the HVAC
- Plumbing systems for circulating and pumping water
- Electrical for lighting and controlling all systems

When building the facility, the design of these systems is important. ASHRAE standards should be considered in design and operations. There are a few other factors to consider:

- participant comfort
- building structural integrity

There are three factors to consider in regards to participant comfort:

- water temperature
- air quality
- relative humidity
- Water quality is another factor, but it will not be covered in this Advisor.

Water Temperature

Water temperature is determined based on the user's activities. For example, with leisure activities, the water temperatures are kept higher so people don't feel cold. The air temperature and relative humidity are higher as well. For more vigorous activities, the water temperature, air temperature and relative humidity will be lower.

Indoor Air Quality

To maintain good indoor air quality, it is important to introduce fresh air and to remove air contaminated with disinfection byproducts. Some codes require six air changes per hour in an indoor pool. Replacing more air is better in reducing contaminants but energy costs are higher in order to bring the air to the desired temperature and humidity. Generally, the air temperature is 2-5 degrees warmer than the water temperature so people are not cold when they get out of the water.

Relative Humidity

Controlling relative humidity in an indoor pool is a balance between energy cost, occupant comfort and preserving building structural integrity. If relative humidity is too low, occupants will be cold when get out of pool. If too high, condensation may result in building structural degradation.

Ideally, deciding on temperatures should be set in the design phase of a facility. If a facility is already operating, it is harder to change systems.

Controlling Moisture

Moisture can cause rusting of aesthetic and structural metals. An operator should regularly log and monitor data to understand how the systems are performing. Buying data loggers and looking at the data regularly can avoid problems and save money over time.

Setting relative humidity at 50-60% is a high limit. When looking at data logging information, you should monitor that your relative humidity is not above 60% and that it is stable. In the winter, exchanging air reduces contaminants but also introduces cold, dry air into the facility. This will cause your temperature and relative humidity to drop.

Systems that are not working properly will have spikes throughout the day in respect to temperature and humidity. These systems are not in control and should be examined to prevent any harm to the facility.

Evaporation Rate

It is important to understand where evaporation rate comes in and how to use it to save energy in indoor facilities.

- If you increase the water temperature and the air temperature at the same time, the rate of evaporation will increase.
- The relative humidity setting will have an impact on your evaporation rate. Air blowing over the pool surface will increase evaporation rate, but will also help remove disinfection byproducts from pool usage.

Other energy saving strategies

- Pool covers help reduce the amount of evaporation and heat loss. Covers can save thousands or even tens of thousands of dollars over the course of a year.
- The ventilation systems may result in overhaul of the facility's energy cost. As a result, design and operation is important. Heat can be recovered from exhaust air to warm incoming air. Many times indoor pools are built in facilities that have other functions like basketball courts, an exercise facility, an ice rink, etc. Designers and engineers should consider opportunities to transfer heat energy from one area to another.
- Boilers are another important source of heat that may be transferred to heat pool or spas. Heat pumps and solar heaters are other options to efficiently transfer energy. Various dehumidification units are available during design or as retrofit options.
- Variable speed drives are gaining traction as tools to reduce energy consumption to circulate water.
- Lighting is complicated. If you turn the lights off, you've actually increased the amount of gas you have to use to heat the air back up. It doesn't save that much. You must consider operating costs and how long the light fixtures are going to last. Some suggestions include:
  - High Efficiency Compact Fluorescents
  - Replace Incandescent Lamps
  - Replace Indirect with HID Lights
  - LED on the Horizon
- Good equipment maintenance is important to help conserve energy.

Indoor pools are big energy users and making efforts to transfer and conserve energy can result in substantial cost savings. Options to reap these savings can be made when a facility is being designed and or when a facility is already operating.

This newsletter is a monthly communication to professionals in the pool and spa industry from the National Swimming Pool Foundation® (NSPF®). The NSPF® is a non-profit organization founded in 1965, committed to improving public health by encouraging healthier living through aquatic education and research.

Troubleshooting Filters

A properly designed and operated pool filtration and circulation system will dilute and flush all areas of the pool equally and will mechanically remove insoluble solid matter from the water. The filtration and circulation systems also provide for equal distribution of cleansed water to all areas of the pool.

Troubleshooting filters does not involve electricity or moving parts unless there is an automatic backwashing system installed. It may, however, necessitate the release of air pressure in a pressure system. For information on specific filters or other types of filters than those covered below, contact the filter manufacturer or refer to your NSPF Pool & Spa Operator™ Handbook.

On March 16, 2010 at 11:00am MST, NSPF will rebroadcast the seminar given by James Amburgey, Ph.D. at the October, 2009 WAHC titled, *Latest Developments in Crypto Removal by Swimming Pool Filters*. Dr. Amburgey is an Assistant Professor in the Department of Civil and Environmental Engineering at the University of North Carolina at Charlotte.

Troubleshooting Pressure Sand Filters

Pool water is not clear or clean

- *Too frequent of a backwash cycle*
  - Backwash according to pressure and not time. See manufacturer's I/O instructions for proper pressure differential (usually 7 to 10 psi above starting pressure).
- *Freeboard not sufficient or improper sand was used for replacement purposes*
  - Check freeboard and sand depth. Make sure of sand specifications.
- *Insufficient turnover rate as compared to total user load*
  - Check flow meter and determine if there are any hydraulic restrictions. Limit user load if necessary.
- *Algae growth*
  - Maintain proper pool chemistry and treat algae as necessary. Test water for total and free chlorine.

Short filter cycles

- *Improper backwash procedures*
  - Follow manufacturer's I/O instructions. Watch sight gauge and backwash until effluent is clear.
- *Sand bed blocked*
  - Removed top 1 to 2 inches of sand and replace. Chemically soak sand bed with commercial sand cleaner and, flush to waste.
- *Algae growth*
  - Maintain proper pool chemistry and treat algae as necessary. Test water for total and free chlorine.
- *High flow rate exceeds Filter Media Rate (FMR)*
  - Use flow meter to manage and restrict water flow through filter.

- *Pool chemicals being fed into recirculation prior to the filter*
    - Relocate chemical input lines to feed after all equipment, including filters and heaters.

High filter pressure

- *Insufficient backwashing*
    - Follow manufacturer's I/O instructions. Watch sight gauge and backwash until effluent is clear.
- *Sand bed blocked with mineral deposits*
    - Chemically soak sand bed with commercial sand cleaner, flush to waste.
- *Blocked return line or partially closed valve*
    - Remove line obstruction or open valve.

Sand in pool

- *Broken under-drain lateral*
    - Replace damaged laterals. Examine sand to determine if high filter pressure caused damage to laterals.

Sand in waste water

- *Damaged distributor or air strainer*
    - Replace damaged items.
- *Backwash rate too high*
    - Reduce backwash flow rate.
- *Improper size sand*
    - Replace sand with new sand having the specifications required by the filter manufacturer.

Flow rate to pool below minimum required and low influent pressure

- *Blockage in suction line to the pump*
    - Check the hair and lint basket. Check the skimmer strainer. Open valves on the suction line.
- *Impeller damaged or broken*
    - Disassemble the pump and repair.

<u>Troubleshooting Vacuum D.E. Filters</u>

Pool water is not clear or clean

- *Filter covering is plugged*
    - Oils, dirt, and minerals have clogged the fabric openings. Remove oils and grease with commercial cleaner. Acid wash only if necessary to remove minerals. Follow the manufacturer's instructions in the I/O manual.
- *Unfiltered water is returning to pool*
    - See unfiltered water instructions below.
- *No D.E. powder on filter grids*

- Follow the manufacturer's instructions in the I/O manual regarding the proper amount of new D.E. to add. The usual amount is 2 ounces per square foot of filter area.

Air bubbles in pool return flow

- *Filter covering is plugged, causing the pump to pull air form the weakest point in the system above water level*
  - Oils, dirt, and minerals have clogged the fabric openings. Remove oils and grease with commercial cleaner. Acid wash only if necessary to remove minerals. Follow the manufacturer's instructions in the I/O manual.
- *Damaged manifold or vacuum piping connections*
  - Inspect manifold, connections and piping for cracks. Inspect all joints. Replace or repair as necessary.
- *Blockage in suction line to the pump*
  - Check the hair and lint basket. Check the skimmer strainer. Open valves on the suction line.

Short filter cycles

- *Filter covering is plugged*
  - See item #1 in first section.
- *Pool chemicals being fed into recirculation prior to the filter*
  - Relocate chemical input lines to feed after all equipment, including filters and heaters.
- *Too little D.E. being added during the pre-coat cycle*
  - Follow the manufacturer's instructions in the I/O manual regarding the proper amount of new D.E. to add. The usual amount is 2 ounces per square foot of filter area.

High filter pressure

- *Filter covering is plugged*
  - See item #1 in first section.
- *Pool chemicals being fed into recirculation prior to the filter*
  - Relocate chemical input lines to feed after all equipment, including filters and heaters.

D.E. in pool

- *Damaged filter element(s)*
  - Inspect elements for any tears or holes.

Unfiltered water returning to pool

- *Damaged filter element(s)*
  - Inspect elements for any tears or holes.
- *Damaged manifold or vacuum piping connections*

- Inspect manifold, connections and piping for cracks. Inspect all joints. Replace or repair as necessary.

Flow rate to pool below minimum required and low influent pressure

- *Blockage in suction line to the pump.*
  - Check the hair and lint basket. Check the skimmer strainer. Open valves on the suction line.
- *Impeller damaged or broken.*
  - Disassemble the pump and repair.
- *Obstruction in impeller.*
  - Remove obstruction, disassemble pump if necessary.