

# Model Aquatic Health CODE

## Draft Module

### Operator Training ANNEX Section Modified after the First 60-day Review that Closed on 10/31/2010

#### Informational Copy: NOT Currently Open for Public Comment

This version of the MAHC Operator Training module has been modified based on the first round of public comments received. It is being re-posted so users can view how it was modified but is not currently open to public comment. The complete draft MAHC, with all of the individual module review comments addressed will be posted again for a final review and comment before MAHC publication. This will enable reviewers to review modules in the context of other modules and sections that may not have been possible during the initial individual module review. The public comments and MAHC responses can be viewed on the web at <http://www.cdc.gov/healthywater/swimming/pools/mahc/structure-content/>

#### MAHC Operator Training Module Abstract

Increased pool code violations have been linked to the lack pool operator training. These violations may also be linked to an increased potential for health effects if a facility is not operated and maintained appropriately. The Operator Training Module is a first step towards assuring adequate training for all personnel who operate aquatic facilities. The Operator Training Module contains requirements for:

- 1) Training course elements to be included in curricula
- 2) Instructor qualifications
- 3) Certificate validity to be for 5 years maximum

To make the module more complete and interpretable, proposed language from the Regulatory Program Administration Module is also included (6.3.1.1, 6.3.1.2). This language outlines the requirement for operator training and the aquatic facilities requiring on-site qualified operators.

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Acronyms in this Module:

See the Operator Training Module, Code Section

Glossary Terms in this Module:

See the Operator Training Module, Code Section

Preface: This document does not address all health and safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to each use.

Model Aquatic Health Code

Operator Training Module  
ANNEX Section

6.0 Policies and Management

*Keyword*

*Section*

*Annex*

6.0 Policies and Management

*Qualified Operator*

6.3.1

CODE sections 6.3.1.1 and 6.3.1.2 is being added to this review module although it is actually proposed

*Definition*

language from the Regulatory Program Administration Module. This should allow reviewers to understand the requirements for QUALIFIED OPERATORS as well as when and where QUALIFIED OPERATORS would be required. This is intended to address public comments received on this issue as part of the first 60-day public comment period on the Operator Training Module. The proper placement for this section is under MAHC 6.3.1: Operator Staff Requirements and Availability.

*Operator  
Qualifications  
and Certification*

## 6.1.1

**Pool and SPA operation and maintenance violations are common.**

POOL inspection data from 15 jurisdictions across the United States indicate that over half (61.1%) of inspections identified  $\geq 1$  violation(s) and 12.1% of inspections resulted in immediate closure because of the seriousness of identified violation(s). In addition, violations regarding the following issues were frequently identified:

- disinfectant level (10.7% of inspections),
- PH level (8.9%),
- other water chemistry (12.5%),
- filtration/recirculation system (35.9%),
- water test kit (3.3%),
- record keeping 10.9%), and
- licensure (2.7%).<sup>1</sup>

Review of SPA inspection reports from these same jurisdictions found over half (56%) of inspections identified  $\geq 1$  violation(s) and 11% of inspections resulted in immediate closure because of the seriousness of identified violation(s). In addition, SPA inspection data indicated that the following violations regarding the following issues are

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<sup>1</sup> Centers for Disease Control and Prevention. Violations identified from routine swimming pool inspections – selected states and counties, United States, 2008. MMWR Morb Mortal Wkly Rep. 2010;59(19):582-587.

frequently identified:

- disinfectant residual (17% of inspections),
- PH level (15%),
- other water chemistry (17%),
- filtration/recirculation system (27%),
- water test kit (2%), and
- record keeping (13%).<sup>2</sup>

The authors conclude that the number of overall violations highlights the need for pool and SPA staff training, which includes information about recreational water illness (RWI) transmission, and the potential benefits of mandating training for pool operators throughout the United States. In addition, it underscores the need for operator training courses to include the topic areas related to the common violations listed above.

The cause of approximately one third of reported RWI outbreaks associated with treated facilities are CHLORINE sensitive. This CHLORINE sensitivity of PATHOGENS involved in outbreaks indicates that these facilities were poorly operated or maintained. The authors conclude that preventing recreational water illness outbreaks, particularly those associated with INADEQUATE public operation of AQUATIC FACILITIES, calls for required pool and SPA operator training.<sup>3</sup>

Of 36 reported pool chemical–associated health events in New York State (1983–2006), 69% (25) were caused by poor chemical handling or storage practices and 81% (27) resulted from mixing incompatible chemicals. The authors conclude that preventing these events calls for educating public

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<sup>2</sup> Centers for Disease Control and Prevention. Surveillance data from public spa inspections — United States, May–September 2002. *MMWR Morb Mortal Wkly Rep.* 2004;53(25):553–555.

<sup>3</sup> Yoder J, Hlavsa M, Craun GF, Hill V, Roberts V, Yu P, Beach MJ. Surveillance for waterborne disease and outbreaks associated with recreational water use and other aquatic facility-associated health events — United States, 2005–2006. *MMWR Surveill Summ* 2008;57:1-38

pool operators and residential pool owners about safe chemical handling and storage practices.<sup>4</sup>

### **Pool operator training reduces pool inspection violations.**

Two studies have shown that pools with operators who have successfully completed formal training in pool operation, have better water quality than pools without a trained operator.

Results from a study in Nebraska demonstrated that FREE CHLORINE violations and concurrent PH and FREE CHLORINE violations were twice as likely in local jurisdictions not requiring certification compared with jurisdictions requiring training. The authors conclude that these results demonstrate the benefit of requiring pool operator certification to help prevent recreational water illnesses.<sup>5</sup>

*Essential Topics  
in Qualified  
Operator  
Training Courses* 6.1.2

Pool inspection data from 15 jurisdictions across the United States indicated that 12.1% of inspections resulted in immediate closure because of the seriousness of identified violations and violations regarding the following issues are frequently identified:

- FREE CHLORINE level (10.7% of inspections),
- PH level (8.9%),
- other water chemistry (12.5%),
- filtration/recirculation system (35.9%),
- water test kit (3.3%),
- record keeping (10.9%), and

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<sup>4</sup> Centers for Disease Control and Prevention. Pool chemical–associated health events in public and residential settings — United States, 1983-2007. *MMWR Morb Mortal Wkly Rep.* 2009;58(18):489-493.

<sup>5</sup> Buss BF, Safranek TJ, Magri JM, Török TJ, Beach MJ, Foley BP. Association between swimming pool operator certification and reduced pool chemistry violations — Nebraska, 2005–2006. *J Environ Health.* 2009;71(8):36–40.

- licensure (2.7%).<sup>6</sup>

SPA inspection data indicated that the following violations regarding the following issues are frequently identified:

- disinfectant residual (17% of inspections),
- PH level (15%),
- other water chemistry (17%),
- filtration/recirculation system (27%),
- water test kit (2%), and
- record keeping (13%).<sup>7</sup>

These analyses underscore the need for inclusion of these topic areas in QUALIFIED OPERATOR courses. These essential topics are covered in nationally recognized operator training courses.

*Water Disinfection*

6.1.2.1

Many other DISINFECTION chemicals or systems with varying effectiveness and suitability are being offered in the market to AQUATIC FACILITY operators for water treatment. In general terms, discuss the evaluation steps that should be used by the AQUATIC FACILITY operator, including required HEALTH AUTHORITY acceptance of the chemicals or systems for public aquatic facilities, in their decision process on using these types of supplemental systems or treatments.

*Disinfectants*

Training should address OSHA “Right-to-Know” and Hazard Communication Standards and other safety aspects.

*Chlorine*

Special emphasis should be given to safe handling

<sup>6</sup> Centers for Disease Control and Prevention. Violations identified from routine swimming pool inspections – selected states and counties, United States, 2008. MMWR Morb Mortal Wkly Rep. 2010;59(19):582-587.

<sup>7</sup> Centers for Disease Control and Prevention. Surveillance data from public spa inspections — United States, May–September 2002. MMWR Morb Mortal Wkly Rep. 2004;53(25):553–555.

<i>Keyword</i>	<i>Section</i>	<i>Annex</i>
		of erosion feeders/chemical mixing. See Annex 6.1.2.1.4.6 for discussion on chemical injuries
<i>Combined Chlorine</i>		A discussion of deterioration of buildings, machinery, and structures due to the effects of airborne chloramines in indoor aquatic facilities is appropriate.
<i>Secondary Disinfection</i>		It is appropriate to include a discussion of the effectiveness of in-line treatment versus side stream treatment.
<i>Supplemental Disinfection</i>		It is appropriate to include a discussion of the effectiveness of in-line treatment versus side stream treatment.
<i>Water Balance</i>		Water balance elements may also include options for treatment including priority of factors to be adjusted.
<i>Water Clarity</i>		Discussions should include treatment priorities to improve clarity.
<i>pH</i>		It is also important to remember that there are limits on Phenol Red readings when very low or very high pH readings occur.
<i>Mechanical Systems</i>		Common current alternative filter media types that can be mentioned include perlite, zeolite, and food-grade cellulose.
<i>Circulation Pump &amp; Motor</i>		The Operator should also become familiar with submerged pumps such as turbine, mixed flow, and others used in waterpark applications.  Additionally, the Operator needs to have an understanding of the winterizing needs for these types of equipment.
<i>Filter Backwashing/ Cleaning</i>		In these days of energy and water conservation, it is increasingly important that water conservation be practiced. Backwash water can be responsible for wasting an unnecessary amount of water if not done properly or too frequently.

If properly treated to meet water quality STANDARDS, AQUATIC FACILITIES can obtain savings with water costs. However, in some cases, it may not be cost effective for a facility to expend funds on retreatment of backwash water. In those cases, it is most important that all water is discharged properly in accordance with the regulations of the local jurisdiction.

*Recreational  
Water Illness*

The number of outbreaks associated with recreational water has continued to substantially increase since reporting began in 1978, most notably in 1982, 1987, 2004, and 2007. CDC recommends that public health and the aquatic sector collaborate on educating the swimming public, an important source of recreational water contamination, about RWIs and what swimmers can do to protect themselves and others.<sup>8</sup>

*RWI Prevention*

The Operator should be aware of the need for frequent manual testing, STANDARDIZATION of automatic controllers, and adequately sized chemical feeders.

Note the need for larger feeders for waterpark type attractions as compared to flat water pools.

*Chemical Safety*

It is important that the operator be able to read chemical labels and material safety data sheets (MSDS). These include but are not limited to, NFPA 400 Oxidizer Hazard Classifications and storage recommendations.

Reporting of pool chemical-associated health events in the United States is not universally mandated, and no single surveillance system exists to characterize completely the number of exposures or associated injuries.

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<sup>8</sup> Yoder J, Hlavsa M, Craun GF, Hill V, Roberts V, Yu P, Beach MJ. Surveillance for waterborne disease and outbreaks associated with recreational water use and other aquatic facility-associated health events — United States, 2005–2006. *MMWR Surveill Summ* 2008;57:1-38.

The National Electronic Injury Surveillance System (NEISS) and National Poison Data System (NPDS) data indicate that pool chemical exposures and associated injuries are common. Data from NEISS show that inhalation of chemical fumes and splashing pool chemicals into the eyes were the primary pool chemical-associated injuries for which patients sought emergency treatment.

NPDS data reveal that nearly all single pool chemical exposures likely were unintentional. Additionally, poor chemical handling and storage practices at public AQUATIC FACILITIES, particularly those leading to mixing of incompatible chemicals, were the primary contributing factors of pool chemical-associated health events reported in New York State.

Although no one data source alone clarifies completely the epidemiology of pool chemical-associated injuries, together they reveal multiple commonalities that suggest these injuries are preventable. CDC recommendations<sup>9</sup> for preventing injuries associated with pool chemicals were based on a review of the New York State health events and other government regulatory guidance.

These recommendations focus on improving

- Facility design and engineering and
- Education and training that stresses safe chemical handling and storage practices and safe and preventive maintenance of equipment.<sup>10</sup>

### *Entrapment*

The Consumer Product Safety Commission (CPSC)

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<sup>9</sup> CDC. Healthy Swimming website. Recommendations for preventing pool chemical-associated injuries. Accessed 02/27/2011 at <http://www.cdc.gov/healthywater/swimming/pools/preventing-pool-chemical-injuries.html>

<sup>10</sup> Centers for Disease Control and Prevention. Pool chemical-associated health events in public and residential settings — United States, 1983-2007. *MMWR Morb Mortal Wkly Rep.* 2009;58(18):489-93.

<i>Keyword</i>	<i>Section</i>	<i>Annex</i>
<i>Prevention</i>		reports injuries and fatalities regarding entrapment in residential and commercial pool and SPA settings. <sup>11</sup>
<i>Aquatic Facility Types</i>		Types of AQUATIC FACILITIES that are recommended to be discussed include pools, spray grounds/ interactive fountains, leisure rivers, therapy pools, spas, wave pools, water slides, competition pools, and wading pools.  Settings of AQUATIC FACILITIES that are recommended to be discussed include community pools, apartment complex/condominium/ homeowners' association pools, hotel/motel pools, and water parks.
<i>Course Length</i>	6.1.3	The MAHC intentionally does not prescribe a particular length of time for courses. Instead, the module is more PERFORMANCE-BASED by requiring that all of the essential topics in 6.1.2.1 be covered during the course. Most nationally recognized operator training courses run approximately 16 hours, and the MAHC technical committee assesses that it would be unlikely that all essential topics could be effectively taught in a shorter time period.
<i>Instructors</i>		Recognized training on AQUATIC FACILITY operation and maintenance as well as instruction (without work experience) is sufficient to qualify an individual to be an instructor if the requirements in CODE section 6.1.3.4 are met. It is, however, ideal to have both work experience and training in operation and instruction.
<i>Final Exam</i>		The final exam is intended to assess the knowledge and skills of the pool operator. Key components of

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<sup>11</sup> Gipson K. Pool and spa submersion: estimated injuries and reported fatalities, 2010 Report. May 2010. Consumer Product Safety Commission. Accessed on 02/27/2011 at <http://www.cpsc.gov/library/foia/foia10/os/poolsub2010.pdf>.

the exam should include questions on the essential topics outlined in Section 6.1.2, performing essential calculations, reading meters and electronic equipment.

In the future it would be ideal if course final exams included more than just knowledge testing and have skills testing. This should include an on-site evaluation of skills such as proper calculations of gallonage and chemicals needed to be added to the AQUATIC FACILITY, how to operate the filtration/recirculation system, including backwashing the filters, and water testing (chemical and physical parameters).

The Conference for Food Protection established Food Protection Managers Certification Program Standards<sup>12</sup>. The MAHC will establish the Conference for Swimmer Protection, which in turn will establish Pool Operator Certification Program Standards. These STANDARDS will address issues such as examination development, test administration, and computer-based testing development and administration.

### *Certificates*

The technical committee recommends that each certificate has a unique identifier to minimize the likelihood of mistaking the identity of certified operators.

At this time, certification process for QUALIFIED OPERATORS is not established; however, the MAHC developers are working to establish a certification program similar to that of the Food CODE. Thus, the Food Protection Managers Certification Program STANDARDS, Section 7.7, "Responsibilities to the Public and to Employers of Certified Personnel" reflect the following, "A certification organization

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<sup>12</sup> Conference for Food Protection. STANDARDS for Accreditation of food protection manager certification programs as amended by the 2010 biennial Conference for Food Protection (Reviewed April 2010 (8/5/2010). Accessed 02/27/2011 at <http://www.foodprotect.org/media/managercert/STANDARDS%20April%202010%20corrected.pdf>

shall maintain a registry of individuals certified.”

These STANDARDS reference certified food operators; however, the same STANDARD shall apply to operator training certificates. Thus, “any title or credential awarded by the course proved organization shall appropriately reflect the” AQUATIC FACILITY operator responsibilities and “shall not be confusing to employers, consumers, related professions, and/or interested parties.”<sup>13</sup>

*Continuing  
Education*

It is recommended that a QUALIFIED OPERATOR continue their education by attending seminars or training courses to keep up-to-date in AQUATIC FACILITY operation and safety.

In the long term, there is a need for development of system for Continuing Education Units. However, it may not be prudent to make the leap to require CEUs all at once, especially since this version of the Model Aquatic Health CODE will require for the first time that all AQUATIC FACILITIES have QUALIFIED OPERATORS. To have new requirements for operators at all AQUATIC FACILITIES and for CEUs may be burdensome.

*Certificate  
Renewal*

Nationally recognized operator training courses require renewal of certificate. However, most professional certifications do not require retaking an entire course to renew certification, just passing an exam.

Most states require these certificates or copies to be readily accessible to the HEALTH AUTHORITY. Copies of certificates should be kept on file at the site and made available upon request. If photocopies are provided as proof of certificate, or certificate renewal, the original documents should

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<sup>13</sup> Conference for Food Protection. STANDARDS for Accreditation of food protection manager certification programs as amended by the 2010 biennial Conference for Food Protection (Reviewed April 2010 (8/5/2010). Accessed 02/27/2011 at <http://www.foodprotect.org/media/managercert/STANDARDS%20April%202010%20corrected.pdf>, page 27

be provided within 72 hours upon request from the HEALTH AUTHORITY.

*Suspension &  
Revocation*

The HEALTH AUTHORITY is expected to contact course providers with questions about the validity of any certificate or with questions about an operator's performance. In turn, course providers are expected to readily provide verification of certificates and suspensions and revocations of certificates and to notify the HEALTH AUTHORITY of actions taken in response to its reported concerns.

The Food Protection Managers Certification Program STANDARDS, Section 7.5 reflect the following, "A certification organization shall have formal certification policies and operating procedures including the sanction or revocation of the certificate. These procedures shall incorporate due process."<sup>14</sup>

*Additional  
Training &  
Testing*

Reasons for requiring such training or testing include but are not limited to operator performance or new developments in technology or operation. Such situations include but are not limited to repeat or serious violations identified on inspection, an investigation implicating operation as a contributing factor to illness or injury, or implementation of substantial rule changes. Training can range from brief dialogue during pool inspection to full-day seminar for all operators in a jurisdiction. Testing can range from questions during inspection to paper- or computer-based exams.

*Certificate  
Recognition*

The technical committee aims to delegate authority to the HEALTH AUTHORITY both to choose to recognize individual certificates and to reverse its decisions if operators with certificates demonstrate INADEQUATE knowledge or poor performance or due

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<sup>14</sup> Conference for Food Protection. STANDARDS for Accreditation of food protection manager certification programs as amended by the 2010 biennial Conference for Food Protection (Reviewed April 2010 (8/5/2010). Accessed 02/27/2011 at <http://www.foodprotect.org/media/managercert/STANDARDS%20April%202010%20corrected.pdf>, page 27

*Keyword*

*Section*

*Annex*

cause.

*Course  
Recognition*

The technical committee aims to delegate authority to the HEALTH AUTHORITY to choose to recognize operator training courses and to reverse its decisions if operators demonstrate INADEQUATE knowledge or poor performance or due cause.

*Certificate  
Validity*

A number of operator training course providers, including the American Swimming Pool & SPA Association, Aquatic Training Institute, National Swimming Pool Foundation, National Recreation and Park Association and YMCA, have set the maximum length of operator certificate validity and certificate renewal at 5 years.

Additional data are needed to re-evaluate this issue.

## **A Note about Resources:**

The resources used in all MAHC modules come from peer-reviewed journals and government publications. No company-endorsed publications have been permitted to be used as a basis for writing CODE or annex materials.

## **Bibliography**

Codes Referenced: None

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## **Additional Resources**

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