

**Model Aquatic Health Code
Regulatory Program Administration ANNEX
for the First 60-day Review**

**Posted for Public Comment on 12/07/11
Currently Open for Public Comment that Closes on 02/05/12**

In an attempt to speed the review process along, the MAHC steering committee has decided to release MAHC draft modules prior to their being fully complete and formatted. These drafts will continue to be edited and revised while being posted for public comment. The complete versions of the drafts will also be available for public comment again when all MAHC modules are posted for final public comment. The MAHC committees appreciate your patience with the review process and commitment to this endeavor as we all seek to produce the best aquatic health code possible.

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MAHC Regulatory Program Administration Module Abstract

Regulatory guidance forms the framework around which an effective model aquatic health code is built. The Regulatory Program Administration Module follows a best practice and research-based protocol to ensure the AQUATIC FACILITY is operating safely. The guidance reflected in this module promotes all parties working together from the initial building permits to the code enforcement process. The Regulatory Module contains requirements for but not limited to:

- 1) Establishment of an independent Aquatic Health Advisory Committee.
- 2) Delineation of imminent aquatic health hazards and corresponding remediation and enforcement procedures.
- 3) Establishment of facility staffing requirements based on facility size and type.
- 4) Plans and permits guidelines
- 5) Recordkeeping requirements
- 6) Swimmer empowerment methods

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MAHC Regulatory Program Administration Module Review Guidance

The [Model Aquatic Health Code \(MAHC\) Steering](http://www.cdc.gov/healthywater/swimming/pools/mahc/steering-committee/)

(<http://www.cdc.gov/healthywater/swimming/pools/mahc/steering-committee/>) and [Technical](http://www.cdc.gov/healthywater/swimming/pools/mahc/technical-committee/)
(<http://www.cdc.gov/healthywater/swimming/pools/mahc/technical-committee/>) **Committees**

appreciate your willingness to review this draft MAHC module. Your unique perspectives and science-based suggestions will help ensure that the best available standards and practices for protecting aquatic public health are available for adoption by state and local environmental health programs.

Review Reminders:

- Please download and use the [MAHC Comment Form](http://www.cdc.gov/healthywater/swimming/pools/mahc/structure-content/) (<http://www.cdc.gov/healthywater/swimming/pools/mahc/structure-content/>) to submit your detailed, succinct comments and suggested edits. Return your review form by 02/05/12, as an email attachment to MAHC@cdc.gov.
- If part of a larger group or organization, please consolidate comments to speed the MAHC response time to public comments.
- To provide context for this module review, please consult the [MAHC Strawman Outline](http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-strawman.pdf) (<http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-strawman.pdf>). Section headers of related content have been included in this draft module to assist reviewers to see where each section fits into the overall MAHC structure. Additional MAHC draft modules that contain this content will be or already have been posted for your review.
- MAHC Grading System
 - A grading system is provided for the recommended standards. It is based on the perceived reliability and accuracy of the material presented. This grading system is divided into three levels. The MAHC grading system is as follows:
 - Grade A: Practice supported by science/research/data.
 - Grade B: Generally accepted practice not supported by science/research/data.
 - Grade C: No generally accepted practice. Proposed language not yet supported by science/research/data.
- 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 published MAHC will be regularly updated through a collaborative all-stakeholder process.

Please address any questions you may have about MAHC or the review process to MAHC@cdc.gov. You may also request to be on the direct email list for alerts (“Get Email Updates” is in a box on the right hand side of the Healthy Swimming website at

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www.cdc.gov/healthyswimming) on the other draft MAHC modules as they are released for public comment.

Thank you again, and we look forward to your help in this endeavor.
Sincerely,

Douglas C. Sackett, Director
MAHC Steering Committee

The Regulatory Program Administration Code Module shows a Table of Contents giving the context of the Regulatory Program Administration Module in the Design, Construction, Operation, Maintenance, Policies and Management in the overall Model Aquatic Health Code's Strawman Outline (<http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-strawman.pdf>).

Reviewer Note on Module Section Numbering:

Please use the specific section numbers to make your comments on this Draft Model Aquatic Health Code module. These numbers may eventually change during the editing of the compiled Draft that will be issued for a final round of comments.

Reviewer Note on the MAHC Annex

Rationale

The annex is provided to:

- (a) Give explanations, data, and references to support why specific recommendations are made;
- (b) Discuss the rationale for making the code content decisions;
- (c) Provide a discussion of the scientific basis for selecting certain criteria, as well as discuss why other scientific data may not have been selected, e.g. due to data inconsistencies;
- (d) State areas where additional research may be needed;
- (e) Discuss and explain terminology used; and
- (f) Provide additional material that may not have been appropriately placed in the main body of the model code language. This could include summaries of scientific studies, charts, graphs, or other illustrative materials.

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Content

The annexes accompanying the code sections are intended to provide support and assistance to those charged with applying and using Model Aquatic Health Code provisions. No reference is made in the text of a code provision to the annexes which support its requirements. This is necessary in order to keep future laws or other requirements based on the Model Aquatic Health Code straightforward. However, the annexes are provided specifically to assist users in understanding and applying the provisions uniformly and effectively. They are not intended to be exhaustive reviews of the scientific or other literature but should contain enough information and references to guide the reader to more extensive information and review.

It is, therefore, important for reviewers and users to preview the subject and essence of each of the annexes before using the document. Some of the annexes (e.g., References, Public Health Rationale) are structured to present the information in a column format similar to the code section to which they apply. Other annexes or appendices provide information and materials intended to be helpful to the user such as model forms that can be used, recreational water illness outbreak response guidelines, and guidelines for facility inspection.

Appendices

Additional information that falls outside the flow of the annex may be included in the Model Aquatic Health Code Appendix

Abbreviations in this Module: See the Regulatory Program Administration Module, Code Section

Glossary Terms in this Module: See the Regulatory Program Administration 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.*

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Model Aquatic Health Code

Regulatory Program Administration Draft Annex

4.0 Design Standards and Construction

<i>Key word</i>	<i>Section</i>	<i>Annex</i>
<i>Design and Construction</i>	4.0	Design Standards and Construction
<i>Plans and Permits</i>	4.1	Plans and Permits
<i>Plan Submittal</i>	4.1.1	Plan Submittal
<i>Content</i>	4.1.2	Content of Design Report
<i>Basis</i>	4.1.2.1	<i>Basis of Design Report</i>
<i>Plans and Specifications</i>	4.1.2.2	<i>Plans and Specifications</i>
<i>Technical Specifications</i>	4.1.2.3	<i>Technical Specifications</i>

Detailed specifications are required to ensure that there is no misunderstanding, ambiguity, or omission between the design professional and the Health Department reviewer.

<i>Plan Approval</i>	4.1.3	Plan Approval
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The construction of public swimming pools should not be undertaken without a thorough review and approval of the proposed construction plans by the AHJ. Construction costs for public pools can be in the millions of dollars and very costly mistakes in design and equipment choices can occur if plans are not reviewed before construction. These mistakes could result in both public health hazards and additional remodeling costs.

Most of the states require that plans be submitted for review and approval by the regulatory authority before a public swimming pool can be constructed. Although there is considerable variation in the amount of information and detail required on the plans, most of the jurisdictions require at least a plot plan with sufficient detail to allow for a reasonable review of the proposed project.

The licensed professional engineer or architect should

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Key word

Section

Annex

have at least one year of previous experience with public swimming pool design. Most states will allow any professional engineer or architect to design a swimming pool. However, since pool technology is sufficiently complex, specific prior experience in pool construction and design is strongly recommended. A minimum of one year of previous experience in pool construction and design is recommended.

All plans should be reviewed and approved or returned with written comments for correction back to the designer within thirty days of receipt of a complete submission. Where other jurisdictions such as Building or Fire Departments are responsible for reviewing plans to determine compliance with their respective codes and regulations there should be an established relationship between the AHJ and these other agencies to ensure coordination of plan review. Any final approval of plans by the AHJ should be dependent on approval by all other appropriate agencies.

For example, the assumption of responsibility for reviewing plans for structural safety and ensuring pool is designed to withstand anticipated loading, not only the pool shell, but also in cases where the pool may be located on an upper floor of a building or a rooftop is generally that of the local building department. If there is no local building code department or requirements, the design engineer or architect must assume responsibility. This may include requiring architect/engineer to certify structural stability of pool shell during full and empty conditions.

The AHJ should retain at least one set of approved plans. The AHJ should provide statements on the approved plans to clarify the terms of the plan approval. Two examples of such statements are in the code section 4.1.1.4.

*Plan Review
Training*

All plan review staff must demonstrate competency to conduct an independent review of plans for a proposed aquatic facility before being so assigned. Training by classroom instruction, apprenticeship, or computer training programs should cover the following:

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Key word

Section

Annex

- Knowledge and understanding of architectural drawings/plans including plot plans, tract maps, and easements on a project site.
- Knowledge and understanding of PE drawings/plans showing all design aspects to ensure the design meets the pool code minimum standards for pools and spas.
- Thorough knowledge of pool code minimum standards, health & safety codes and local ordinances. Also, familiarity with the applicable NEC/Electric code (Bonding, GFCI, and Electrical Disconnect, required pool and deck lighting), and UPC/IPC for plumbing and hydraulics and UBC/IBC for construction is desirable.
- The ability to validate the designing professional's calculations including the following: location and number of outlets and required separation, usage of approved suction outlet sumps whether manufactured or field built, number of inlets, number of skimmers, approved flow rates or GPM through covers not being exceeded, approved suction flow velocity rates not exceeded, approved return flow rates not being exceeded, location and number of depth markers, decking and required drainage, entry/exits, tanning ledges, benches, steps, coping, circulation filters, pumps (hp, max gpm), and gauges (pressure inlet, outlet vacuum), flow meters and their required locations, acceptable turnover rate, bather loads, barrier requirements including height, maximum gaps in barrier and within latching mechanism, gate requirements and climb hazards.

After all training is completed, the pool plan review candidate should initially review sets of new pool plans and create a list of plan deficiencies for review by a trainer or person with known competency in pool plan review. Upon demonstration that the candidate has acquired the necessary knowledge and skill sets to review a pool without assistance, a final confirmatory test should be given. The gold standard for ascertaining this final competency is by separate review of the same plans by the trainee and the trainer. In this final plan review test, a trainer or a person with known competency separately reviews at least three sets of aquatic facilities of varying complexity. The list of pool plan deficiencies and

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		comments separately prepared by the trainer and trainee are compared for uniformity. When the trainee has successfully demonstrated competency they can be permitted to review pool plans.
	4.1.3.1	<i>New Construction</i>
<i>Plans Maintained</i>	4.1.3.1.6	A copy of the approved plans, certificate of construction compliance and all related pool construction documents are to be maintained onsite by the permit holder and made available to health department or appropriate regulatory authority staff upon request.
<i>Alterations</i>	4.1.3.2	<i>Alterations</i>
<i>Replacements</i>	4.1.3.3	<i>Replacements</i>
		Most jurisdictions allow for replacements in-kind. Refer to Form 3: MAHC Minor Repair Plan Review Application in this annex for a sample form.
<i>Certificate of Compliance</i>	4.1.4	<i>Certificate of Compliance</i>
	4.1.5	<i>Permits</i>
<i>Permit Denial</i>	4.1.5.3.2	It is recommended to create or use the established appeals process in the AHJ. Additionally the MAHC recommends the creation of an Aquatic Health Advisory Committee (AHAC) (MAHC Section 6.7) in the AHJ. The AHAC plays an important “independent” review function in the overall appeals process.

Model Aquatic Health Code
Regulatory Program Administration Draft ANNEX
5.0 Operation and Maintenance

Key word	Section	Annex
<i>Operation</i>	5.0	Operation and Maintenance
<i>Operating Permits</i>	5.1	Operating Permits
<i>Inspections</i>	5.2	Inspections
<i>Preoperational Inspections</i>	5.2.1	Preoperational Inspections
<i>Exemptions</i>	5.2.2	Exemptions
<i>Variances</i>	5.2.3	Variances
<i>Variance Authority</i>	5.2.3.1	The permit issuing official may waive, in writing, any of the requirements of this code, and include the variance as a condition of the permit to operate, when it reasonably appears that the public health and safety will not be endangered by granting of such a variance and adequate alternative provisions have been made to protect the health and safety of the bathers and the public. The burden of providing the data and proof that any alternative provision is at least as protective at the code requirement is entirely on the permit holder.
<i>Variance Requests</i>	5.2.4	Variance Requests
<i>Hearing</i>	5.2.4.3.1	It is recommended to create or use the established appeals process in the AHJ. Additionally the MAHC recommends the creation of an Aquatic Health Advisory Committee (AHAC) (MAHC Section 6.7) in the AHJ. The AHAC plays an important “independent” review function in the overall appeals process.

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**Model Aquatic Health Code:
Regulatory Program Administration Draft ANNEX
6.0 Policies and Management**

Key word	Section	Annex
Policies and Management	6.0	Policies and Management
Operator Training	6.1	Operator Training
Lifeguard Training	6.2	Lifeguard Training
Facility Staffing	6.3	Facility Staffing
Operator Availability	6.3.1	Operator Availability

Numerous studies have concluded that pools with operators that have gone through formal training on maintenance and operation of pools, have less violations than pools without a trained person available.^{1, 2}

Results from a cross-sectional study after a 2006 outbreak in Nebraska demonstrated that pools without certified operators are more likely to have free chlorine and pH violations than those with certified operators and might pose increased risk of recreational water illness.¹

Another study showed significant differences between certified versus non-certified operators in levels of pH and combined chlorine, and compliance with combined chlorine standards. The authors conclude the need for increased knowledge and training on maintaining safe chemical conditions in the water.²

The etiologic agent of approximately one quarter to one-third of reported recreational water illness outbreaks associated with treated venues are chlorine sensitive. This indicates that the implicated venues were poorly operated and maintained. The occurrence of waterborne disease

¹ Buss BF *et al.* Association between swimming pool operator certification and reduced pool chemistry violations — Nebraska, 2005–2006. *J Environ Hlth.* 2009;71(8):36–40.

² Johnston K *et al.* Certified operators: does certification provide significant results in real-world pool and spa chemistry? *Int J Aquatic Res Ed.* 2007;1(1):18–33.

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Key word

Section

Annex

outbreaks associated with inadequate public pool operation concludes the need for trained operators.^{3,4,5,6,7}

The need for trained personnel on site at aquatic facilities and accessible on weekends when pool use is highest is also illustrated by surveillance data.³ One common lesson learned is that outbreaks often occur on weekends and involve large events, and in many cases the primary operator is off on weekends.

Other surveillance data depict the settings of the pools where outbreaks occurred. Twenty-two of 58 (38%) outbreaks associated with treated recreational water venues were linked to venues in hotels or membership clubs.⁴

When the CDC reviewed spa inspection reports from regulatory jurisdictions, the authors concluded the “data emphasizes that spa operators can protect the health of users by obtaining appropriate training. Successful prevention strategies must address operator and inspection training.”⁸

CDC has not only concluded that operator training is necessary to prevent waterborne illness, they also concluded it is necessary to prevent chemical accidents and injuries. Research highlights the need for improved staff training on how to safely store and handle chemicals, and emergency response protocols.^{4,9}

³ Dziuban EJ *et al.* Surveillance for waterborne disease and outbreaks associated with recreational water — United States, 2003–2004. *MMWR Surveill Summ.* 2006;55(SS-12):1–30.

⁴ Yoder J *et al.* Surveillance for waterborne disease and outbreaks associated with recreational water use and other aquatic facility–associated health events — United States, 2005–2006. *CDC. MMWR Surveill Summ.* 2008;57(SS-9):1–38.

⁵ Hlavsa MC *et al.* Surveillance for waterborne disease outbreaks and other health events associated with recreational water use — United States, 2007–2008. *MMWR Surveill Summ* 2011;60:1-37.

⁶ CDC. Surveillance data from swimming pool inspections — selected states and counties, United States, May–September 2002. *CDC. MMWR Morb Mortal Wkly Rep.* 2003;52 (22):513–6.

⁷ CDC. Violations identified from routine swimming pool inspections --- selected states and counties, United States, 2008. *MMWR Morb Mortal Wkly Rep.* 2010;59(19):582-587.

⁸ CDC. Surveillance data from public spa inspections — United States, May–September 2002. *MMWR Morb Mortal Wkly Rep.* 2004; 53(25):553–5.

⁹ CDC. Acute illness and injury from swimming pool disinfectants and other chemicals --- United States, 2002–2008. *MMWR Morb Mortal Wkly Rep.* 2011;60(39):1343-1347.

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Section

Annex

Further, “the disproportionate (86%) number of pool chemical--associated health events occurring in settings where pools were not the primary focus (e.g., schools or hotels) specifically calls for emphasizing training efforts in these settings.”¹⁰

An evaluation of violation data in one municipality showed a higher level of violations and repeat violations in facilities that did not have a nationally trained operator on staff.¹¹

These studies reveal that many pools when operated by inadequately trained staff are more likely to have significant operational violations that result in injury or illness. Ideally, all pools should have adequately trained staff on-site. However, this is not practical or economically feasible. The committee took into consideration the increased risk in larger, more frequently used pools in striking the definition of where an on-site versus off-site trained operator is required. This is considered the first step in which the overall goal is to have on-site qualified operators provided at all aquatic venues.

On-site Qualified
Operator

6.3.1.1

On-Site Qualified Operator

In constructing the definition of which classes of aquatic facilities needed to have an on-site qualified operator the committee did not want to include all aquatic facilities with just one or two aquatic venues. Many facilities have two aquatic venues—a main pool and a wading pool—but would otherwise not fall into a class requiring an on-site operator. However, the committee believed that any aquatic facility with three or more aquatic venues, regardless of all other factors, reached a threshold of needing an on-site qualified operator. The other categories of aquatic facilities that are listed as requiring an on-site qualified operator were selected after much discussion and review and were based on aquatic venue size, usage, usage by higher risk groups, and aquatic venues with inherent increased risk because of design features (e.g.,

¹⁰ CDC. Pool chemical—associated health events in public and residential settings---United States, 1983-2007. CDC. MMWR Morb Mortal Wkly Rep. 2009;58(18):489-93.

¹¹ Vyles, T. Growth and evolution of a municipal pool safety and inspection program. J Environ Hlth. 2009;71(10):40-44.

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		spray features. Spray features have been implicated in a number of cryptosporidiosis outbreaks. The committee reviewed the HICPAC guidelines for infection control at health care facilities. The guidelines do not require any training certification for therapy pool operators. The final category—those with a history of code violations—is designed to give the Health Jurisdiction the opportunity to require on-site qualified operators in cases where operational violations are repeatedly found. This is similar to the discretion given by code to many Health Jurisdictions to require that operators of restaurants with repeated violations complete a food manager’s training course.
Off-Site Qualified Operator	6.3.1.2	<i>Contracted Off-Site Qualified Operator</i> Off-site qualified operators should be able to respond immediately by phone to emergency calls from their client aquatic facilities. They should discuss the problems with the aquatic facility owner or responsible supervisor by phone, advise the on-site individual to make simple adjustments where appropriate, and inspect the pool as soon as possible.
Facility Management	6.4	Facility Management
Operations	6.4.1	Operations
Daily Operation Records	6.4.1.3.1	<i>Daily Operation Records</i>
Communication		The maintenance and repair of communication devices and dispatch systems shall preserve compliance with the National Electrical Code, especially NEC Article 800.
Daily Inspection Items	6.4.1.3.1.2	Fecal/vomit/blood incident contamination response protocols, materials, and equipment are available. The protocol has been posted separately, but will be merged in the next MAHC draft. Refer to http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-fecal-vomit-blood-contamination-response-module.pdf and http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-fecal-vomit-blood-contamination-

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		response-annex.pdf for the proposed fecal/vomit/blood draft module.
<i>Monitoring and Testing Records</i>	<i>6.4.1.3.2</i>	<i>Monitoring and Testing Records</i>
<i>Illness and Injury Reports</i>	<i>6.4.1.3.3</i>	<i>Illness and Injury Reports</i>
		<p>The pool owner/operator should immediately report to the permit issuing official any injuries resulting in death or that require emergency medical response, resuscitation or transport to medical facility, or any illness suspected of being associated with bathing water quality or use of the aquatic facility. The pool owner/operator will have posted and available for use the routine phone numbers and after hours phone numbers necessary for reporting to the permit issuing official. This will facilitate a rapid investigation of the incident and could result in limiting further spread of disease and additional injuries.</p> <p>Most jurisdictions have some reporting requirements. This section is more comprehensive than the existing reporting requirements of many jurisdictions. Prompt reporting of significant injuries or waterborne illness allows for the permit issuing agency to immediately assess the conditions at the aquatic venue to determine if it can continue to operate safely or must be closed. Prompt reporting and investigation also allows for more accurate investigations to determine the causes of injury and illness. This information can be used to prevent future injuries or illness.</p> <p>Investigations lead to an understanding of the factors leading to the incident. Therefore investigations should be conducted in a standardized way with standardized tools to maximize the ability to elucidate the lessons learned from the incident. These lessons can then be used to develop and implement future prevention strategies. A draft investigation form for drowning or near-drowning events can be found in the Regulatory Program Administration Appendix. An outbreak toolkit for recreational water illness swimming pool-associated outbreaks can be found on CDC's Healthy Swimming website at http://www.cdc.gov/healthywater/swimming/toolkits/. This includes various documents for investigation and</p>

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		remediation including an “Environmental Health Outbreak Investigation Survey: Swimming Pool Venue” form.
<i>Patron-Related Management</i>	6.4.2	<p>Patron-Related Management Aspects</p> <p>Aquatic injuries and illnesses can occur after normal office working hours; therefore, a 24/7 system for reporting and responding to injury and illnesses at AQUATIC VENUES must be maintained. Early reporting and intervention could reduce the spread of illness or prevent additional injury.</p> <p>Reports of injuries (see MAHC Form 2: Drowning and Near-Drowning Investigation Form) and illnesses should be evaluated by Health Department supervisory staff as to their severity and the threat to public health and safety that may still exist at the venue. The Investigations of reported injuries and illnesses should be based on this risk evaluation. The CDC National Waterborne Disease Outbreak Reporting form (URL links provided below) should be used for reporting outbreak investigations.</p> <p>Forms for Reporting Waterborne Disease and Outbreaks http://www.cdc.gov/healthywater/statistics/wbdoss/nors/forms.html</p> <p>NORS-Water Form Guidance: http://www.cdc.gov/healthywater/pdf/statistics/wbdoss/nors/CDC_5212_guidance.pdf</p> <p>NORS-Water Form: http://www.cdc.gov/healthywater/pdf/statistics/wbdoss/nors/NORS_CDC_5212_static.pdf</p> <p>6.4.2.1 Bather Load</p> <p>6.4.2.2 Signage</p> <p>6.4.2.3 User Guidelines</p> <p>6.4.2.4 Swimmer Empowerment Methods</p>
<i>Post Inspection Score</i>	6.4.2.4.1	<p>There are only a relatively small number of municipal organizations that require public or web-based disclosure of inspection reports. However, as inspection activity is tax-payer supported, there is a growing trend toward</p>

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		requiring public disclosure. One recent example is the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000, a Federal Act that requires public disclosure of coastal beach closings. Additionally, DeKalb County, Georgia requires the public posting of inspection results for aquatic facilities as well as posting them on the internet, which is similar to the ever expanding requirement for posting inspection results at food service establishments. The posting of inspections at aquatic facilities will increase public awareness of aquatic safety and health and encourage aquatic operators to comply with all code requirements. The MAHC will expound upon this after receiving public comment.
<i>Certificates Posted</i>	6.4.2.4.2	Most jurisdictions require the permit to be conspicuously posted. This is to inform the public that the facility has met the minimum safety standards required by law.
	6.5	Fecal/Blood/Vomit Contamination Response
	6.6	Investigations and Inspections
<i>Inspection Authority</i>	6.6.1.1	<p>The Health Department has the authority to enter the facility for both routine inspections and to investigate reports of illness and injury. At the time of investigation, all records and facility personnel required for interviews must be available.</p> <p>The MAHC committees encourage facility personnel to refer to the CDC RWI Outbreak Toolkit (http://www.cdc.gov/healthywater/emergency/toolkit/rwi-outbreak-toolkit.html) for information about what to do with a potential RWI outbreak. Also the MAHC Form 2: "Model Drowning and Near-Drowning Investigation Toolkit" provides a guide for procedures after a drowning or near-drowning accident.</p>
<i>Risk Based Inspections</i>	6.6.1.3	<i>Risk-Based Inspections</i>
<i>Purpose and Scope</i>		<p>1. Purpose and Scope</p> <p>This Annex information provides program managers and front-line inspection staff with guidance on planning, scheduling, conducting, and evaluating risk-based</p>

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Section

Annex

inspections. The material in this section is based on proven guidance found in the 2009 FDA Food Code, Annex 5: Conducting Risk Based Inspections 1. The *FDA's Voluntary National Retail Food Regulatory Program Standards* at

<http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/ProgramStandards/default.htm> (revised December 2007 and April 2009) provide additional recommendations to assist program managers in the planning and development of a risk-based inspection program.

The primary focus of this section is to provide inspectors with methods for conducting risk-based inspections. Various strategies that can be used by regulatory professionals to assist operators in achieving active operator control of waterborne illness and injury risk factors are also included in this section.

As presented below, the Centers for Disease Control and Prevention (CDC) identifies the most frequently reported contributing factors to the spread of recreational water illnesses, in particular gastroenteritis. Another report identified the most frequently reported type of recreational water illness (RWI) outbreak as gastroenteritis, the incidence of which is increasing.⁵ Prevention of RWIs at treated venues requires pool operators to:

- 1) Maintain appropriate disinfectant and pH levels to maximize disinfectant effectiveness and
- 2) Ensure optimal water circulation and filtration.

A study of pool inspection data underscored the need for improved maintenance.⁷ A total of 13,532 (12.1%) of 111,487 inspections identified serious violations that threatened the public's health and resulted in immediate pool closure. Of 120,975 inspections, 12,917 (10.7%) identified disinfectant level violations; of 113,597 inspections, 10,148 (8.9%) identified pH level violations. Other water chemistry violations were documented during 12,328 (12.5%) of 98,907 inspections, with the number identified per inspection ranging from zero to four. Circulation and filtration violations were documented during 35,327 (35.9%) of 98,361 inspections, with the number identified per inspection ranging from zero to nine. The following violations also were identified: improperly

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Key word

Section

Annex

maintained pool log (12,656 [10.9%] of 115,874 inspections), unapproved water test kit used (2,995 [3.3%] of 90,088 inspections), valid pool license not provided and/or posted (741 [2.7%] of 28,007 inspections), and operator training documentation not provided and/or posted (1,542 [18.3%] of 8,439 inspections).

Of the 121,020 inspection records, 59,890 (49.5%) included pool setting data. Among venues with known pool settings, child-care pool inspections had the highest percentage of immediate closures (17.2%), followed by hotel/motel and apartment/condominium pool inspections (15.3% and 12.4% respectively) (Table 1: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5919a2.htm#tab1>). Apartment/condominium and hotel/motel pool inspections had the highest percentage of disinfectant level violations (13.1% and 12.8%, respectively). Child-care and apartment/condominium pool inspections had the highest percentage of pH level violations (11.8% and 10.0%, respectively). Approximately 35% of inspections of apartment/condominium pools, hotel/motel pools, and water parks identified circulation and filtration violations.

Of the 121,020 inspection records, 113,632 (93.9%) included pool type data. Interactive fountain inspections had the highest percentage of immediate closures (17.0%). Kiddie/wading pool inspections had the highest percentage of disinfectant level violations (13.5%), followed by interactive fountain inspections (12.6%). Therapy pool inspections had the lowest percentage of disinfectant and pH level violations but the highest percentage of other water chemistry violations (43.9%). Interactive fountain inspections identified the lowest percentage of circulation and filtration violations (12.8%).

Drowning and falling, diving, chemical use, and suction injuries continue to be major public health injuries associated with aquatic venues. Drowning is a leading cause of injury death for young children ages 1 to 4, and the fifth leading cause of unintentional injury death for people of all ages.¹² From 2008 through 2010, an average

¹² Centers for Disease Control and Prevention. Wide-ranging OnLine Data for Epidemiologic Research (WONDER) [online]. (2010) Available from URL: <http://wonder.cdc.gov/mortsql.html>.

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Key word

Section

Annex

of 5,100 pool- or spa-related emergency department (ED)-treated submersion injuries occurred each year. For 2006-2008, 383 pool- or spa-related fatalities involved children younger than 15 years of age. Approximately 45% of the estimated injuries for 2008 through 2010 and 28% of the fatalities for 2006 through 2008 involving children younger than 15 occurred in a public setting.¹³

For 2007-2008, 32 pool chemical--associated health events that occurred in a public or residential setting were reported to CDC by Maryland and Michigan. These events resulted in 48 cases of illness or injury; 26 (81.3%) events could be attributed at least partially to chemical handling errors (e.g., mixing incompatible chemicals). ATSDR's Hazardous Substance Emergency Events Surveillance System received 92 reports of hazardous substance events that occurred at aquatic facilities. More than half of these events (55 [59.8%]) involved injured persons; the most frequently reported primary contributing factor was human error. Estimates based on CPSC's National Electronic Injury Surveillance System (NEISS) data indicate that 4,574 (95% confidence interval [CI]: 2,703--6,446) emergency department (ED) visits attributable to pool chemical--associated injuries occurred in 2008; the most frequent diagnosis was poisoning (1,784 ED visits [95% CI: 585--2,984]).⁵

The information identified in this report along with existing recreational water injury data and first hand inspector experience drove the development of the critical risk factors for recreational water injury and illness at treated aquatic venues. The critical risk factors cited below are located in the Regulatory Program Administration Annex: Draft Model Facility Inspection Form. The 8 broad critical risk factors for recreational water illness and injury are:

- Management; supervision; training; operation
- Lifeguard services
- Disinfectant residual
- pH level (low or hi)

¹³ Gipson K. Pool or Spa Submersion: Estimated Injuries and Reported Fatalities, 2011 Report. U.S. Consumer Product Safety Commission, May 2011. Available online at <http://www.cpsc.gov/LIBRARY/FOIA/FOIA11/os/poolsub2011.pdf>.

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Key word

Section

Annex

- Water clarity
- Facility enclosure; entry protection
- Entrapment protection
- Water supply/waste disposal

Low or absent disinfectant levels lead to reduced inactivation of pathogens and these conditions have been associated with infectious disease outbreaks.⁵ Low pH has been associated with loss of dental enamel.^{14,15,16} Dental erosion begins to occur below pH 6.0 and rapidly accelerates as the pH drops. High pH reduces the efficacy of chlorine-based disinfection by reducing the amount of molecular hypochlorous acid (HOCl), the active form that is available for disinfection. At pH 7.0, about 70% of the hypochlorous acid is molecular, at pH 7.5 about 50% is molecular, at pH 8.0 about 20% is molecular, and at pH 8.5 only 10% is molecular. As a result, the MAHC decided to set upper and lower limits for pH as an imminent health hazard.

*Risk-Based Routine
Inspections*

2. Risk-based Routine Inspections

Inspections have been a part of recreational water safety regulatory activities for many years. The term "routine inspection" has been used to describe periodic inspections conducted as part of an on-going regulatory scheme.

Program managers should strive to have adequate staffing and resources to allow all inspectors ample time to thoroughly evaluate aquatic venues and ask as many questions as needed to fully understand aquatic facility' operations. For most jurisdictions, however, inspectors continue to have limited time in which to complete inspections. This does not negate the need to thoroughly identify and assess the control of recreational water injury and illness risk factors during each inspection.

It is a false assumption that inspectors cannot conduct

¹⁴ Centerwall BS *et al.* Erosion of dental enamel among competitive swimmers at a gas-chlorinated swimming pool. *Am J Epidemiol.* 1986;123(4):641-7.

¹⁵ Dawes C, Boroditsky CL. Rapid and severe tooth erosion from swimming in an improperly chlorinated pool: case report. *J Can Dent Assoc.* 2008;74(4):359-61.

¹⁶ Geurtsen W. Rapid general dental erosion by gas-chlorinated swimming pool water. Review of the literature and case report. *Am J Dent.* 2000;13(6):291-3.

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Key word

Section

Annex

risk-based inspections in a limited timeframe. Even with limited time, inspectors can focus their inspections on assessing the degree of active operator control an operator has over the recreational injury and illness risk factors. By focusing inspections on the control of recreational injury and illness risk factors, inspectors can be assured that they are making a great impact on reducing recreational water injury and illness.

Active operator control means the purposeful incorporation of specific actions or procedures by industry management into the operation of their businesses to attain control over recreational water injury and illness risk factors. It embodies a preventive rather than reactive approach to recreational water safety through a continuous system of monitoring and verification.

Developing and implementing recreational water safety management systems to prevent, eliminate, or reduce the occurrence of recreational water injury and illness risk factors is recommended to achieve active operator control. Regulatory inspections and follow-up activities must be proactive by using an inspection process designed to evaluate the implementation of Model Aquatic Health Code interventions and the degree of active operator control that aquatic staff and aquatic facility operators have over recreational water injury and illness risk factors. The eight broad critical risk factors encompass a wide range of control measure specifically designed to protect patron health

When Model Aquatic Health Code interventions are not being implemented or if behaviors, activities, or procedures likely to cause or increase the risk of recreational water injury or illness are observed, inspectors should verify that the operator takes immediate corrective action so that consumers do not become sick or injured. Observations made on the day of the inspection, as well as information gained about the behaviors, activities, and procedures that occur at other times, allow inspectors to assess the strengths and weaknesses of the recreational water safety management system that is in place.

An operator should be made aware of the inspectional findings both during, and at the conclusion of, the

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Key word

Section

Annex

inspection. Strategies for achieving compliance in the future should be discussed. Corrective actions taken during the inspection and repeat violations should be noted on the inspection report. Repeat violations should trigger further compliance and enforcement actions.

The inspection process is also an opportunity to educate the operator on the public health reasons supporting the Code requirements. If operators are afforded the chance to ask questions about general recreational water safety matters, they may clearly understand the public health significance of non-compliance.

Lastly, if the operator demonstrates a history of violations related to recreational water injury and illness risk factors, the inspection process can be used to assist the operator with implementing long-term control systems to prevent those risk factors from occurring in the future.

*Properly Conducted
Inspection*

3. What is needed to Properly Conduct a Risk-based Inspection?

A. Schedule Inspections Based on Risk

Studies have shown that the types of aquatic venues, location of aquatic venues, and patron number and populations served all have a bearing on the occurrence of recreational water injury and illness risk factors in aquatic facilities. Regulatory jurisdictions should develop and use a process that groups aquatic facilities or venues into categories based on potential and inherent recreational water injury and illness risks. In addition, regulatory jurisdictions should assign inspection frequency based on the risk categories to focus program resources on aquatic facilities with the greatest recreational injury and illness risk. With limited resources, creating a variable inspection frequency for each category will allow inspection staff to effectively spend more time in increased risk venues that pose the greatest potential risk of recreational water injury and illness.

The Model Aquatic Health Code has identified aquatic venues with increased risk for causing injury and illnesses. Each jurisdiction is encouraged to develop risk categories tailored to their specific program needs and resources, and

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Key word

Section

Annex

they are also encouraged to reassess the risk categories on an annual basis. Additionally, the following factors are among many that regulatory jurisdictions sometimes use to justify an increase in inspection frequency:

- History of non-compliance with provisions related to recreational injury and illness risk factors or critical items
- Specialized types of venues or populations served
- Patron loading
- History of recreational injury and illness and/or complaints

B. Have the Proper Equipment

In order to conduct risk-based inspections, each inspector must be provided with the proper equipment to assess the control of waterborne injury and illness risk factors within aquatic venues. Moreover, at a minimum, the pool program must provide equipment to inspectors to accomplish the following while conducting pool inspections and investigations:

(a) Measure water quality parameters, including:

- Disinfectants,
- pH,
- Total alkalinity,
- Calcium hardness,
- Cyanuric acid,
- Water temperature,
- Water clarity;

(b) Assess facility safety, including:

- Ground fault interrupter (gfi) tester,
- Secchi disk with metered rope,
- Clarity disk – a disk of contrasting colors designed for assessing pool water clarity,
- Light meter,
- Tape measure,
- Digital camera.

Key word

Section

Annex

C. Provide Adequate Training

Regulatory staff shall have the knowledge, skills, and ability to adequately perform their required duties. Inspectors need the proper training before they can be expected to conduct risk-based inspections. Training includes a combination of classroom training, in-field training, standardization, and continuing education. For specific training recommendations for plan reviews refer to Regulatory Program Administration Annex 4.1.3.1.2.

D. Ensure Adequate Program Resources

Regulatory agencies should have adequate funding, staff, and equipment necessary to support a risk-based recreational water safety program designed to reduce the occurrence of recreational water injury and illness risk factors. Program management should do everything they can to secure funding and resources to support regulatory recreational water safety.

Every jurisdiction has a unique combination of factors that determine staffing levels—such as density of facilities and complexity of those operations. Operating hours/duration and programs with multiple inspection requirements are also determinants of individual staffing requirements. Jurisdictions in areas with tremendous growth may require different staffing (for plan reviews and inspections) than one with primarily operational inspections. The program budget should provide the necessary resources to develop and maintain a recreational water safety program that has a staffing level of one full-time equivalent (FTE) devoted to recreational water for every # Inspections performed (*MAHC is seeking public comment on this ratio*). Inspections, for purposes of this calculation, include routine inspections, re-inspections, complaint investigations, outbreak investigations, compliance follow-up inspections, risk assessment reviews, plan reviews, process reviews, variance process reviews, and other direct establishment contact time such as on-site training.

*Risk-Based
Inspection
Methodology*

4. Risk-based Inspection Methodology

A. Focus the Inspection

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Section

Annex

Conducting a risk-based inspection requires inspectors to focus their efforts on evaluating the degree of active operator control that operators have over recreational water injury and illness risk factors. In addition, it is essential that the implementation of the Model Aquatic Health Code interventions also be verified during each inspection. Inspectors need to spend the majority of their time observing the behaviors, practices, and procedures that are likely to lead to out-of-control recreational water injury and illness risk factors and asking management and aquatics employees' questions to supplement actual observations.

Aquatic facility operators implement "control measures" to ensure recreational water safety. Control measures are actions or activities that are used to prevent, eliminate, or reduce recreational water safety hazards. Inspectors need to determine the control measures that should be implemented to prevent the occurrence of recreational water injury and illness in the key functional areas/processes of the aquatics venue. In order to determine the recreational water injury and illness risk factors common to each key functional area/process, it is important for inspectors to understand that the aquatic facility operation and all the associated control measures initiated by an aquatic facility operator represent a recreational water safety management system. It will be necessary for inspectors to ask questions in order to gain information about the system already in place. Once the degree of active operator control is determined, inspectors will be able to assist operators with strengthening their existing recreational water safety management systems.

B. Lead by Example

Nonverbal communication is just as important as verbal communication in relaying important recreational water safety principles to aquatic facility service operators. By setting the example during inspections, inspectors not only demonstrate competency, but they also relay important recreational water safety information to the operator and aquatic facility employees. The following are ways that inspectors set the example during inspections:

The appropriate use of recreational water safety testing

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Key word

Section

Annex

equipment which includes using properly calibrated instruments, appropriate sampling methodology, and “non-expired” reagents.

Set the example by using scientifically accurate recreational water safety testing equipment.

Use appropriate handling procedures and personal protective equipment when inspecting chemical storage rooms/supplies and/or observing chemical handling procedures.

Wear safety goggles or other appropriate safety gear when inspecting pumps and/or other pressurized systems.

C. Conduct Inspections at Variable Times

Inspectors should enter the aquatic facility during hours of operation or at other reasonable times. Inspectors should show identification and provide the permit holder or person in charge with a verbal or written notice of the purpose of the inspection. Procedures outlined in the Model Aquatic Health Code or jurisdiction should be followed if access to conduct an inspection is denied. Refusal should be documented on the inspection report and an administrative or judicial inspection order obtained.

In planning for inspections, inspectors should consider the importance of timing. Factors such as bather loading, time of day, day of the week, sun exposure, specific events, irregular sanitization/cleaning procedures should be considered when determining inspection timing. In order to properly evaluate critical processes that occur outside of the normal 8 a.m. to 5 p.m. working hours, an inspector should be allowed the flexibility to conduct inspections early in the morning, late in the evening, and even on weekends.

D. Establish Inspection Priorities and Use Inspection Time Wisely

With the limited time allotted for inspections, inspectors must develop clear priorities to make the most efficient use of their time in each aquatic facility. Although basic sanitation issues generally do not change during the

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Key word

Section

Annex

course of an inspection, critical behaviors, practices, and procedures leading to recreational water injury and illness risk factors may be only observable during limited time periods of the inspection process. For this reason, assessment of the active operator control of recreational water injury and illness risk factors should generally be performed before reviewing basic sanitation issues.

To effectively set priorities, the following four activities should be completed early in the inspection:

- 1) Establish an open dialogue with the person in charge
- 2) Review previous inspection records
- 3) Conduct a review of key functional areas/processes
- 4) Conduct a quick walk-through.

1) Establish an open dialogue with the person in charge

The tone of the inspection is often set during the first few minutes of the inspection. A professional but personable approach is the balance which should be maintained. Genuine interest in the aquatic facility and the staff translates into good relations which may be helpful in conveying the goal of promoting public health. Having an open dialogue with the person in charge during all phases of the inspection gives inspectors an opportunity to learn important information about the existing recreational water safety management system.

It is important to know both the strengths and weaknesses of the existing recreational water safety management system early in the inspection in order to focus the inspection on weak areas. Questions about practices and procedures related to recreational water injury and illness risk factors and Model Aquatic Health Code interventions such as operator/employee training should be asked during all phases of the inspection. It is important to ask enough questions to fully understand the system being utilized in the aquatic facility. This is especially true when evaluating whether the employees are adhering to monitoring and testing criteria for disinfectant residual, pH range, and other water clarity measures. Asking the person in charge questions about important activities such as monitoring and testing criteria, employee supervision

Key word

Section

Annex

and training, lifeguarding services, facility enclosure and entrapment protection is also important in relaying the importance of out-of-control recreational water injury and illness risk factors.

The person in charge, the qualified operator or responsible supervisor, should be encouraged to accompany inspectors during the inspection. This may ultimately save time since violations can be pointed out and corrected as they are observed. In addition, the importance of violations related to recreational water injury and illness risk factors and Model Aquatic Health Code interventions is more apparent if they are pointed out during the inspection rather than waiting until the end. Violations should be marked on the inspection form even if immediate corrective actions are taken. Corrective actions taken should also be recorded on the inspection form. Inspectors can also use this time to share knowledge about critical processes. By communicating the public health rationale behind the regulations, inspectors will leave the person in charge with a clear understanding for why active operator control of recreational water injury and illness risk factors must be a top priority in the day-to-day operation of the aquatic facility.

Early in the inspection, inspectors should inquire about activities that are presently occurring or will be occurring during the inspection. Processes that occur over time like lifeguarding need to be assessed over time.

It is important for inspectors to allow the operator a chance to discuss issues related to recreational water safety. One-way communication in which inspectors do all the talking is not conducive to a risk-based philosophy. An effective risk-based inspection is dependent on inspectors' ability to maintain two-way communication in order to properly assess behaviors, processes, and procedures that occur in the aquatic facility.

2) Review Previous Inspection Reports

In order to detect trends of out-of-control recreational water injury and illness risk factors, it is important for inspectors to review past inspection reports to identify trends before conducting an inspection. This can be done in the office or

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Key word

Section

Annex

on-site in the aquatic facility. This activity is especially important in jurisdictions where inspectors rotate from one inspection to the next. If the same recreational water injury and illness risk factor is out-of-control during more than one inspection, it is strongly recommended that the operator develop an intervention strategy to prevent its recurrence. Intervention strategies are discussed later.

Knowledge of what has been corrected from the last inspection also gives inspectors an opportunity to provide positive feedback to the operator and allows inspectors to track corrected violations in accordance with their jurisdiction's policies and procedures.

3) Conduct a review of key functional area/processes

Key functional areas/processes can be reviewed in a fairly simple manner. The review can either be done simultaneously with a quick walk-through of the operation or at the beginning of the inspection as a discussion with management. The key functional area/processes review does not need to be reviewed during every inspection. If a review was done during a recent inspection, inspectors should inquire about new procedures or changes in operations that have the potential to impact patron health. Follow-up on new "approved/permitted" aquatic features and/or physical changes to the facility which may include the addition of new pumps, filtration equipment, entrapment prevention devices, facility enclosure modifications, and disinfection equipment/materials, is critically important. It is also important to inquire about maintenance on existing equipment at the aquatic facility. A review of key functional areas/processes allows inspectors to begin to arrange functional areas/processes into similar groups. Mentally grouping functional areas/process assists inspectors in focusing the inspection on the control measures critical to each process. Conducting a review of the key functional areas/processes allows inspectors to establish inspection priorities by identifying:

- Increased-risk processes or areas of the aquatic facility. These types of areas could include "kiddie" pools, spray features, spas, and areas with heavy patron loading. For example, it is important when

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Key word

Section

Annex

grouping functional areas to include all areas served by a single disinfection system into one group. A good example would be a group of spray features served by a singular disinfection system.

- Operational steps requiring further inquiry such as disinfectant mixing, water safety monitoring and testing procedures, and lifeguarding/injury prevention procedures.

4) Conduct a Quick Walk-through

As inspectors discuss the key functional areas/processes and establish open communication with the person in charge, it is suggested that they conduct a quick walk-through of the aquatic facility to observe what is going on at that time.

Speaking directly to the aquatic facility employees is also an excellent way to assess the effectiveness of the establishment's recreational water safety training and standard operating procedures for critical processes such as monitoring and testing of the water. Noting that monitoring or testing is occurring at the beginning of the inspection allows inspectors an opportunity to take advantage of viewing "real-life" processes and will help inspectors to obtain a clear picture of the establishment's true practices. Monitoring and testing only occur during limited times, so inspectors may want to stop and observe these operational steps while they are happening.

E. Assess Active Operator Control of Recreational Water Injury and Illness Risk Factors and Implementation of Model Aquatic Health Code Interventions

Every aquatic facility needs to have active operator control of recreational water injury and illness risk factors. This may be achieved through several means, such as training programs, operator oversight, or standard operating procedures. For example, some aquatic facilities incorporate control measures into employee job descriptions to achieve active operator control.

While a person in charge may require the maintenance of in-house written records by employees to ensure that

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Key word

Section

Annex

monitoring is being performed using the correct method and at the proper frequency, recreational water injury and illness risk factors may be managed without the use of formal record keeping. Monitoring, whether through direct observations or by taking appropriate measurements, is by far the most important step in ensuring recreational water safety. If an operator is effectively monitoring all critical activities in the aquatic facility and taking corrective actions when needed, a safe recreational water experience will result. Recordkeeping is a critical intervention in the Model Aquatic Health Code, however in some cases not all needed records may exist at the time of inspection. As a result, it will be necessary to use direct observations and interviewing to determine whether an aquatic facility is adequately monitoring recreational water injury and illness risk factors in their existing recreational water safety management system.

This section provides a comprehensive discussion of how to assess the active operator control of each of the critical recreational water injury and illness risk factors and the implementation of each of the Model Aquatic Health Code interventions. Assessment of active operator control involves more than determining compliance with Model Aquatic Health Code interventions. In assessing whether the operator has active control, inspectors should observe whether the operator has established the appropriate control measures and critical limits and whether appropriate monitoring and corrective action procedures are in place and followed. In addition, inspectors should assess whether managers and employees are knowledgeable of recreational water safety principles and critical practices and procedures necessary to prevent recreational water injury and illness. If during the inspection inspectors observe that control measures are not being implemented appropriately to control risk factor occurrence, immediate corrective action must be taken.

- 1) Monitoring and testing for disinfectant residual, pH range and water clarity
- 2) Management; supervision; training
- 3) Operation and maintenance
- 4) Lifeguarding services
- 5) Facility enclosure; entry protection
- 6) Entrapment protection

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Section

Annex

7) Water supply/waste disposal

F. Evaluating Basic Sanitation and Facilities

An important part of a risk-based, routine inspection is to review how the aquatic facility actively monitors the active operator control of recreational water illness risk factors and interventions; however, overall sanitation should not be overlooked. Systems to control basic operational and sanitation conditions within an aquatic facility are the foundation of a successful recreational water safety management system. Basic operational and sanitation programs must be in place to:

Protect patrons and recreational water from contamination by biological, chemical, and physical safety hazards

Examples of concerns addressed by the basic operation and sanitation programs mentioned above include the following:

- Pest control
- Recreational water protection
- Equipment maintenance
- Water
- Plumbing
- Toilet facilities
- Sewage
- Garbage and refuse disposal
- Physical facilities.

*Achieving On-Site
and Long-Term
Compliance*

5. Achieving On-site and Long-term Compliance

A. Developing an Effective Compliance and Enforcement Protocol

Compliance and enforcement are essential elements of a regulatory program and encompass all voluntary and regulatory enforcement actions taken to achieve compliance with regulations. It's important for regulatory jurisdictions to establish a compliance and enforcement protocol that results in credible follow-up for each violation noted during an inspection, especially violations related to recreational water injury and illness risk factors and Model

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Key word

Section

Annex

Aquatic Health Code interventions. Lack of follow-up on the part of the regulatory agency signals to the operator that the priority item and priority foundation item violations noted were not important.

The resolution of out-of-compliance recreational water injury and illness risk factors and Model Aquatic Health Code interventions must be documented in each aquatic facility record. Compliance and enforcement options may vary depending on state and local law. It is essential that regulatory jurisdictions develop a written compliance and enforcement protocol that details the order in which both voluntary corrections may be taken on the part of the operator and involuntary enforcement actions are to be taken on the part of the regulatory authority. Involuntary enforcement actions include, but are not limited to, such activities as warning letters, re-inspections, citations, administrative fines, permit suspensions, and hearings.

Aquatic facilities with a history of noncompliance at a level predetermined by the jurisdiction or with the number of recreational water injury and illness risk factors and interventions violated warranting a regulatory action, signals the need either a strong regulatory response or an alternate approach to compliance to protect public health, e.g., active operator control, behavioral change.

Voluntary corrections taken on the part of the operator include, but are not limited to, such activities as on-site corrections at the time of inspection, risk control plans, and remedial training. Obtaining voluntary corrections "intervention strategies" by the operator can be very effective in achieving long-term compliance. Intervention strategies can be divided into two groups:

- Those designed to achieve immediate on-site correction
- Those designed to achieve long-term compliance.

Successful intervention strategies for out-of-control recreational water injury and illness risk factors can be tailored to each operation's resources and needs. This will require inspectors to work with the operator to identify weaknesses in the existing recreational water safety management system and consulting with the operator to

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Key word

Section

Annex

strengthen any weak areas noted.

B. On-site Correction

On-site corrections are intended to achieve immediate corrective action of out-of-control recreational water injury and illness risk factors posing an immediate, serious danger to the patron during the inspection. Usually these violations are "operational" rather than structural and can be addressed by management at the time of the inspection.

It is essential to patron protection and to regulatory credibility for on-site correction to be obtained for any out-of-control recreational injury and illness risk factors before completing the inspection and leaving the aquatic facility. Obtaining on-site correction conveys the seriousness of the violation to management. Failure to require on-site correction when an out-of-control risk factor has been identified implies that the risk factor has little importance to recreational water safety.

When recommending on-site correction, effective communication regarding out-of-control recreational water injury and illness risk factors is essential and can be accomplished best by:

- Discussing recreational water safety concerns in words that can be easily understood by the person in charge and employees, and
- Conveying the seriousness of the out-of-control recreational water injury and illness risk factors in terms of increased risk of illness or injury.

During the discussion of inspection findings with the person in charge, inspectors should keep the discussion focused on correction of violations that present an immediate danger to the patron. Discussion of less serious code violations should be deferred until out-of-control recreational injury and illness risk factors are discussed and on-site correction is obtained.

In most cases, selecting the most appropriate on-site correction when out-of-control recreational injury and illness risk factors are observed will be straightforward;

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Section

Annex

however, in instances such as broken or ineffective disinfection/filtration equipment or malfunctioning entrapment prevention devices, the appropriate corrective action may be more complicated. Since determining on-site correction depends on a number of factors, an inspector may need to conduct a hazard analysis to determine the appropriate course of action to take.

C. Intervention Strategies for Achieving Long-term Compliance

While on-site correction of out-of-control recreational water injury and illness risk factors is essential to patron protection, achieving long-term compliance and behavior change is equally important. Overcoming several misconceptions about long-term compliance will help in achieving a desirable change of behavior. For example, in jurisdictions using inspection reports on which only observed violations are marked, it is often taken for granted that if there are no violations marked, the recreational water injury and illness risk factors are being controlled. This is not necessarily true since the observation of code violations is subject to many variables such as the time of day, day of the week, or duration of the inspection. An inspection system that records only observed violations rather than the actual status of all recreational water injury and illness risk factors, such as whether the risk factor was in compliance, not observed, or not applicable to the operation, may be unable to detect some recreational water injury and illness risk factors that are continually or cyclically out of control.

Another misconception is that training alone will result in recreational water risk factors being controlled. While training is a critical step, there is no guarantee that the knowledge acquired will equate to knowledge applied in the workplace. In order for knowledge to translate into changed behavior, it must be reinforced and the behavior must be repeated for a period of time sufficient for the behavior to become an ingrained pattern. Another assumption is that regulatory enforcement actions such as citations or administrative hearings or on-site corrections alone will automatically result in future management control. Unfortunately, there is no assurance that any of these actions will result in the long-term control of

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Section

Annex

recreational water injury and illness risk factors.

Long-term compliance may best be achieved through voluntary actions by the operator. If an operator supports the concept that a recreational water safety management system is needed, there is a better chance that long-term compliance will be achieved.

*Inspection Form
and Scoring*

6. Inspection Form and Scoring

A. The Inspection Form

The inspection form is the official document utilized by a regulatory agency for documentation of compliance of the aquatic facility with regulatory requirements. The goal of the inspection form is to clearly, concisely, and fairly present the compliance status of the aquatic facility and to convey compliance information to the operator at the conclusion of the inspection.

The inspection report should be maintained and displayed per Model Aquatic Health Code recommendations.

The Model Aquatic Health Code, Regulatory Program Administration Annex provides a draft model inspection form and marking guide (Appendix Form 1) that may be completed for routine, follow-up, and compliance inspections. A review of available current forms from across the country shows a wide variety of categorizing and marking violations. The proposed form provides for some standardization and simplification, but also allows for more detailed categorization, if the jurisdiction prefers. The emphasis of this form is capturing specific water quality data and linking the observations of non-compliance with specific performance standards specified in the code.

Additionally, each jurisdiction is encouraged to use electronic inspection data capture, retrieval, and ongoing analysis for program management and public health protection in this important community environmental health program. This MAHC Draft Facility Inspection Report Form is meant to serve as a model template for

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Key word

Section

Annex

those electronic data systems.

To make this analysis meaningful, the MAHC Draft Facility Inspection Report form has adopted from the Food Code Inspection form, the proven data capture tool of recording the categories as **In** or **Out** of compliance, **Not Applicable** or **Not Observed**. Under traditional inspection report marking, if an item was not marked, the default analysis assumption was that it was in compliance. In reality, the aquatic feature may have been under repair so water turbidity was not an issue. Recording that fact in the Remarks section did not lend itself well to data analysis.

B. Debiting Methodology

If a violation exists during an inspection, it should always be marked on the inspection report, even if corrected on site. Violations existing at the time of the inspection probably would have persisted if it were not for the inspection.

It is very important to investigate the root causes of violations and mark them appropriately. Without taking this extra step, inspectors will merely point out violations and will not identify weaknesses in the management system in place. If long-term control of the behaviors or practices leading to the violations is expected, inspectors must identify the causes.

C. Scoring

Regulatory agencies may use scoring methods to rate aquatic facilities. Depending on the system used, facility scoring may provide an indication of how well an aquatic facility is complying with the aquatic safety rules of the regulatory agency.

Some agencies use a system of compliance tools similar to those provided in Chapter 8 and Annex 1 of the Food Code to protect public health. The inspection score may serve as the basis for triggering follow-up inspections or other forms of regulatory sanctions when they fall too far from the accepted levels. In addition, scoring may provide a mechanism for consumers to make informed choices

Key word

Section

Annex

regarding where they want to swim.

Use of scoring systems can also have negative consequences. For example, it is possible for an aquatic facility to receive a high numerical or letter score while exhibiting some very serious deficiencies. In recognition of this drawback, some jurisdictions forego scoring systems in favor of demerits or debit systems without assigning a final score. This focuses attention on the items needing correction. Compliance and enforcement decisions can still be based on the increasing levels of identified deficiencies. Whatever method or system of establishment rating is used, policies regarding follow-up and enforcement actions should be established in writing, linked to the rating system, and administered consistently.

Closing Conference

7. Closing Conference

The closing conference should include a detailed discussion of the aquatic facility plans for correcting violations found during the inspection. The evidence collected or observed during the inspection and the alternatives available for compliance should be emphasized. On-site corrections made during the inspection should be acknowledged on the inspection report and in the closing conference.

The compliance plan should address changes in procedures that will prevent the recurrence of noted violations. The aquatic facility compliance plans should be formally documented on the inspection report form. Follow-up letters may be necessary to elicit fulfillment of these agreements. It is important to stress to the operator that long-term correction of violations related to recreational water injury and illness risk factors and Model Aquatic Health Code interventions is far more important than corrections of core items.

*Database
Construction,
Management, and
Data Entry*

8. Database Construction, Management, and Data Entry

Inspections are an essential component of every state or local government pool program. Collecting and analyzing inspection data can help pool programs identify common violations of pool regulations and give them the evidence

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Key word

Section

Annex

they need to determine priorities to help ensure healthy and safe swimming experiences in their communities. This is especially important for many pool officials, whose tightening budgets require them to make strategic decisions on how to best use their limited resources to effectively protect the public health and safety.

Before creating a pool inspection database, it is important for pool program officials to determine what information is needed to support program activities, decision making, and evaluation, and to consult with epidemiology colleagues to examine opportunities to collaborate. Establishing these objectives will determine what and how data are collected, entered, and analyzed.

CDC recommends the use of electronic inspection data to facilitate:

- Data analysis (for example, electronic forms can help ensure all required information is collected, uniform data entry, and data quality) and
- Use of these data for public health decision making (for example, planning and evaluation)

Capturing electronic data at point of observation (for example, using a handheld computer) is ideal but not always possible. Another option is to scan data collection forms to reduce the resource burden. Electronic data can also allow for public access if inspection reports are uploaded to the web. Specific recommendations and rationale for pool inspection data collection and database construction resulting from an analysis of pool inspection data⁷ can be found at

<http://www.cdc.gov/healthywater/swimming/pools/regulation/recommendations-pool-inspection-data-collection.html>.

*Risk-Based
Inspection
Summary*

9. Summary

Although an aquatic facility operator has the responsibility for establishing a recreational water safety management system for controlling recreational water injury and illness risk factors, inspectors have a vital, multi-faceted role in patron protection. It is essential that inspectors are provided with the proper training, equipment, time, and

Key word

Section

Annex

resources to adequately perform their jobs.

The primary role of inspectors is to ensure that the operator has effective control of recreational water injury and illness risk factors. Once inspectors have established a dialogue with the person in charge and employees, inspectors will have enough information to mentally place key functional areas/processes into groups. The inspection can then focus on assessing the operator's active managerial control of recreational water injury and illness risk factors associated with each functional area/process.

Once out-of-control recreational water injury and illness risk factors are identified, the role of inspectors shifts to assisting the operator with strengthening the existing recreational water safety management system through intervention strategies designed to achieve immediate and long-term compliance. With inspector's assistance, an aquatic facility operator can achieve long-term behavioral change resulting in a reduction in risk factor occurrence and an increase in public health protection.

Training of
Inspection Staff

6.6.1.4

Training of Inspection Staff

Staff training varies widely among jurisdictions. A clear objective however, is to have all inspectional staff demonstrate competency to conduct an independent inspection of an aquatic facility before being so assigned. Training, either by classroom, or computer module should cover the topics of swimming pool circulation, filtration, water chemistry, water testing, disinfection, spa and warm water facilities, hazard identification, safe handling of pool chemicals and facility maintenance. After the text training is completed, the candidate should accompany a trainer or person with known competency in pool inspections until it is believed he/she has acquired the necessary knowledge and skills to inspect a pool without assistance. The gold standard for ascertaining this final competency is by field testing. In this final field test, a trainer or a person with known competency accompanies the trainee on at least three inspections of aquatic facilities of varying complexity. The trainer separately prepares an inspection report at the end of each inspection. The trainer and trainees inspections must match completely for all imminent health hazard violations and be within 80% agreement on all

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Key word

Section

Annex

other violations.

To ensure uniformity there should be at least one side-by-side inspection with a training inspector per year and any time there is a major code change.

6.6.2 Publication of Inspection Forms

6.6.3 Forms

6.6.4 Imminent Health Hazard Violations

Imminent health hazard violations must be corrected at the time of inspection or the pool must be closed until the violations are corrected. Whenever a pool is closed due to a public health violation, signage must be posted stating that the facility is closed due to an imminent health hazard. Before removing the closure sign and reopening the feature, A follow-up inspection or other evidence of correction of the violations is required to ascertain correction and re-open the pool. The violations constituting imminent health hazards are listed in the code under 6.6.4.1.

The factors being considered imminent health hazards cover known risk areas:

- Low or absent disinfectant levels lead to reduced inactivation of pathogens and these conditions have been associated with infectious disease outbreaks.
- Low pH has been associated with loss of dental enamel. Dental erosion begins to occur below pH 6.0 and rapidly accelerates as the pH drops.¹⁴⁻¹⁶ High pH reduces the efficacy of chlorine-based disinfection by reducing the amount of molecular hypochlorous acid (HOCL), the active form that is available for disinfection. At pH 7.0, about 70% of the hypochlorous acid is molecular, at pH 7.5 about 50% is molecular, at pH 8.0 about 20% is molecular, and at pH 8.5 only 10% is molecular. As a result, the MAHC decided to set upper and lower limits for pH as an imminent health hazard.
- Injuries/deaths occur to persons using equipment such as vacuums and reach poles at swimming pools when

Key word

Section

Annex

this equipment contacts overhead wires which are too close to the pool.

- Clearance in any direction from the water, edge of pool, etc. is to protect people using rescue and service equipment at pools, which are typically aluminum.
- Clearance in any direction to the diving platform, tower, waterslide or other fixed pool related structure is to protect a swimmer using these items.
- Follow-up procedure for observance of electrical lines within 20 feet of a swimming pool during an inspection:
 - Determine whether the electrical lines are owned by the utility company or by the owner/operator of the swimming pool/property.
 - If they are owned by the utility company, the operator should obtain a letter from the utility company stating that these lines are in compliance with NESC standards.
 - If the lines are owned by the owner/operator, and there is no waiver or variance, it is a PHH.
 - This requirement does not apply to wiring inside walls/ceilings, etc. at an indoor pool.

6.6.8 Fees

The fee schedule and applicable fees should be set by the AHJ to meet local needs.

6.7 Aquatic Health Advisory Committee

A Note About Resources

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

Codes Referenced

NEC Article 800

U.S. National Model Food Code

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Additional Resources

Appendix 1: Forms

Form 1: Draft Model Facility Inspection Report

Form 2: Drowning and Near-Drowning Investigation Tool. *Draft is courtesy of the New York State Department of Health*

Form 3: Minor Remodel Plan Review Application. *Draft is courtesy of the Sacramento County Environmental Management Department*

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Form 1: Draft Model Facility Inspection Report

Aquatic Facility Inspection Report and Marking Guide

Introduction

The Aquatic Facility Inspection Report is the official regulatory authority document regarding compliance of the establishment with agency requirements. The goal of the report is to clearly, concisely, and fairly present the compliance status of the establishment and to convey compliance information to the permit holder or person in charge at the conclusion of the inspection. It also provides the public the basic information they may need about the compliance status of the aquatic facility.

The MAHC Facility Inspection Report Marking Guide should be reviewed in concert with the suggested form. It provides guidance for using and completing the items in the report. The guide also provides a cross-reference between suggested inspection categories and MAHC code sections.

The Aquatic Facility Inspection Report form is provided as a model for use during routine, follow-up, and investigative inspections. Jurisdiction may modify the specific format and content to meet their own administrative and program requirements.

The form can serve not only the purpose of providing compliance information, but it can be used for surveillance of trends and through analysis provide evidence for program impact and opportunities for improvement. It can also serve as a template for the development of electronic inspection information capture systems which will facilitate the communication of this information to the operator, public and provide an aquatic health inspection dataset that facilitates this analysis.

Aquatic Health Inspection Agency
1234 Healthy Swimming Way
Best City, US 56789 / 123.555.4567
www.healthyswimming.gov

**Model Aquatic Health Code
Draft Facility Inspection Report**

Date: ____/____/____
Time: In ____/____/____

Facility Name:		Permit #:		Inspection Type:		Inspection Results:						
Street Address:		City:	State:	Zip:								
Owner:		Service:	Violations: Critical / Other		If Required, Follow Up Date: / / Page 1 of							
<small>Legal Notice: An inspection today reviewed this facility's compliance with the Model Aquatic Health Code. Items marked "Out of Compliance" jeopardize the health and safety of your patrons and staff and are violations of the Code. They must be corrected before the next inspection with immediate priority given to the critical items. Failure to make corrections may result in the suspension or revocation of the permit to operate this facility, may result in the immediate closure of a feature or this facility and/or civil or other penalties provided for in the Code.</small>												
Feature	pH	Cl Br	Free	Total	Stabilizer	T.A.	Flow	Pressure		F	Other	Comment
				ppm	(mg/L)		gpm	Influent	Effluent		(specify)	
1.												
2.												
3.												
4.												
5.												

Inspection Results												
<small>Bold= Critical (*) IN = In compliance OUT = Not In compliance NA = Not Applicable N/O = Not Observed</small>												
#	Compliance Status				Categories	#	Compliance Status				Categories	
Recreational Water Quality						Safety						
01.	IN	OUT		N/O	Disinfectant Residual	12.	IN	OUT		N/O	Facility Enclosure: Entry Protection	
02.	IN	OUT		N/O	pH Range	13.	IN	OUT		N/O	Entrapment Protection	
03.	IN	OUT		N/O	Water Clarity	14.	IN	OUT		N/O	Facility Safety and Emergency Equipment; Plans	
04.	IN	OUT	N/A	N/O	Chloramine; Stabilizer Control	15.	IN	OUT		N/O	Feature Safety	
05.	IN	OUT		N/O	Contamination Control	16.	IN	OUT		N/O	Chemical Storage; Use	
						17.	IN	OUT		N/O	Feature / Facility Lighting	
Personnel						Facilities						
06.	IN	OUT		N/O	Management: Supervision; Training	19.	IN	OUT		N/O	Water Supply / Waste Disposal	
07.	IN	OUT	N/A	N/O	Lifeguard Services	20.	IN	OUT	N/A	N/O	Restrooms; Diaper Changing	
						21.	IN	OUT		N/O	Facility Operation; Maintenance	
						22.	IN	OUT		N/O	Feature Operation; Maintenance	
Monitoring												
08.	IN	OUT	N/A	N/O	Test Kit; Calibration; Monitoring Records							
Recirculation / Filtration / Disinfection / Chemical Feed												
09.	IN	OUT		N/O	Recirculation Systems							
10.	IN	OUT		N/O	Filtration Systems							
11.	IN	OUT		N/O	Disinfection / Chemical Feed Systems							

Inspection Results						
<small>Bold= Critical (*) OUT = Not In compliance R = Repeat COS = Corrected On Site</small>						
#	a/b/c	Code Reference	R COS By Date	Location / Feature #	Description	
OUT						
OUT						
OUT						
OUT						
OUT						
OUT						
OUT						
OUT						
OUT						
OUT						
Remarks:						

Inspector:	Accepted by:
Phone:	Title:

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Model Aquatic Health Code Draft Facility Inspection Report Marking Guide

Administrative Information

Aquatic Health Inspection Agency
 1234 Healthy Swimming Way
 Best City, US 56789 / 123.555.4567
 www.healthyswimming.gov

**Model Aquatic Health Code
 Draft Facility Inspection Report**

Date: ___/___/___
 Time: In ___/Out ___

Facility Name:		Permit #:		Inspection Type:		Inspection Results:	
Street Address:		City:	State:	Zip:			
Owner:	Service:	Violations:	Critical /	Other /	If Needed, Follow Up Date:	/ /	Page 1 of
Legal Notice: An inspection today reviewed this facility's compliance with the Model Aquatic Health Code. Items marked "Out of Compliance" jeopardize the health and safety of your patrons and staff and are violations of the Code. They must be corrected before the next inspection with immediate priority given to the critical items. Failure to make corrections may result in the suspension or revocation of the permit to operate this facility, may result in the immediate closure of a feature or this facility and/or civil or other penalties provided for in the Code.							

Time: In/Out – Specify AM or PM or use 24 Hour Clock Time, i.e., 1400/1535; **Inspection Type** – Examples: Routine, Re-inspection, Complaint, Investigation, Owner Change, Quality Assurance, Pre-opening, Other – *specify*; **Inspection Results** – Examples: Satisfactory, Unsatisfactory, Feature Closed, Facility Closed, Incomplete, Other – *specify*; **Owner** – Permit Holder; **Service**, *if applicable* – Name of contract maintenance service provider; **Violations** – Total number of **Critical** and Other Violations for this inspection; **Follow Up Date** – Based on the criticality of the violations, or closure of the feature or facility for major non-compliance a date for a follow-up inspection should be specified; **Page 1 of ___** - If additional space is needed, the following continuation pages can be added to the report with the total number of pages specified here and in header for each continuation page. **Legal Notice:** Each jurisdiction can substitute their own standard Legal Notice or not use one, if not required by their administrative procedures.

Water Disinfection & Quality, Recirculation, and Filtration

Feature	pH	Cl	Free	Total	Stabilizer	T.A.	Flow gpm	Pressure		°F	Other (specify)	Comment
		Br	ppm (mg/L)			Influent		Effluent				
1. Swimming Pool	8.2	Cl	0.0	0.5	N/A	100	50	15	23	N/A	-	
2. Spa	7.4	Br	1.4	N/A	N/A	110	70	20	26	100		
3.												

Feature – Individual water features with its own recirculation and disinfection system; Specify **Chlorine (Cl)** or **Bromine (Br)** **Free and Total** – Residuals in Parts Per Million (PPM) or milligram/liter (mg/L); **Stabilizer** – Measurement in PPM; **Total Alkalinity (T.A.)** (PPM); **Flow** – Recirculation system flow rate in Gallons Per Minute (GPM); **Filter Pressure** – Influent and Effluent pressure measurement; **Water Temperature** - Temperature, particularly of spas, in **Degrees Fahrenheit (°F)**; **Other** – available for different parameters desired by inspection agency.

To meet jurisdictional needs, additional data fields can be added to this section or to a pre-inspection report. These data fields can include:

- facility type (apartment/ condominium, campground, camp, child care, hospital, hotel/motel, membership club, municipal, school/university, water park, other – specify)
- feature location (indoor / outdoor)
- feature's surface area (ft²)
- feature volume (gallons)
- required minimum turnover rate (gpm)
- oxidation reduction potential (ORP)
- total dissolved solid(TDS)
- disinfectant source (sodium hypochlorite, calcium hypochlorite, dichloroisocyanuric acid, trichloroisocyanuric acid, bromine, salt generator)
- secondary disinfection (UV, ozone)
- entrapment prevention measures

This MAHC Inspection Report Form has space for capturing the data for 5 separate water features. It can be adjusted by adopting jurisdictions to their own mix of aquatic facilities and features. Many have each aquatic features permitted and inspected individually. Other jurisdictions include all aquatic features and associated support facilities and management / staffing included under a single permit and inspection report. *This section can be adjusted to each program's administrative and inspection process.*

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Inspection Report Categorical Results and Compliance Details

The complete aquatic facility and each aquatic feature within it should be evaluated against the complete MAHC during a routine inspection. The categories in this DRAFT MAHC Inspection Report and Marking Guide provide a convenient operational frame of reference for conveying the findings in the operational areas. The “Out of Compliance” items are detailed in the following Narrative Description Section of the Inspection Results. The actual MAHC code section references for each “Out of Compliance” item are the most important standard for comparing and reporting the conditions being observed at the time of the inspection. See the last section of this Marking Guide for appropriate categorization and recording the violations.

Note: Each jurisdiction as they adopt MAHC is free to add their own report subcategories or different report categories.

Inspection Results											
Bold= Critical (*) IN = In compliance OUT = Not In compliance N/A = Not Applicable N/O = Not Observed											
#	Compliance Status				Categories	#	Compliance Status				Categories
Recreational Water Quality					Safety						
01.	IN	OUT		N/O	*Disinfectant Residual	12.	IN	OUT		N/O	*Facility Enclosure; Entry Protection
02.	IN	OUT		N/O	*pH Range	13.	IN	OUT		N/O	*Entrapment Protection
03.	IN	OUT		N/O	*Water Clarity	14.	IN	OUT		N/O	Facility Safety and Emergency Equipment; Plans
04.	IN	OUT	N/A	N/O	Chloramine; Stabilizer Control	15.	IN	OUT		N/O	Feature Safety
05.	IN	OUT		N/O	Contamination Control	16.	IN	OUT		N/O	Chemical Storage; Use
						17.	IN	OUT		N/O	Feature / Facility Lighting
Personnel					Facilities						
06.	IN	OUT		N/O	*Management; Supervision; Training	19.	IN	OUT		N/O	*Water Supply / Waste Disposal
07.	IN	OUT	N/A	N/O	*Lifeguard Services	20.	IN	OUT	N/A	N/O	Restrooms; Diaper Changing
						21.	IN	OUT		N/O	Facility Operation; Maintenance
Monitoring											
08.	IN	OUT	N/A	N/O	Test Kit; Calibration; Monitoring Records	22.	IN	OUT		N/O	Feature Operation; Maintenance
Recirculation / Filtration / Disinfection / Chemical Feed											
09.	IN	OUT		N/O	Recirculation Systems						
10.	IN	OUT		N/O	Filtration Systems						
11.	IN	OUT		N/O	Disinfection / Chemical Feed Systems						

Each inspection should thoroughly consider each of the operational areas of the aquatic facility and feature. To be meaningful for public health surveillance analysis, this categorization needs to have the outcome of each component specified as “In Compliance” (IN), “Out of Compliance” (OUT), “Not Applicable” (N/A), or “Not Observed” (N/O). The analyst cannot assume if an item is not marked, it was in compliance because the category may not be applicable in this facility (i.e., does not use stabilized chlorine disinfectants) or may not be observed (i.e., contamination control training records were not accessible). The “Remarks” section of the report may contain this information, but they are not easy to use in the program analysis. Routine analysis of inspection results can provide useful insights for reduction of risks and program improvement.

Here are examples of how the Categories can be completed and linked to the full description of the OUT of compliance items:

Inspection Results											
Bold= Critical (*) IN = In compliance OUT = Not In compliance N/A = Not Applicable N/O = Not Observed											
#	Compliance Status				Categories	#	Compliance Status				Categories
Recreational Water Quality					Safety						
01.	IN	OUT		N/O	*Disinfectant Residual	12.	IN	OUT		N/O	*Facility Enclosure; Entry Protection
02.	IN	OUT		N/O	*pH Range	13.	IN	OUT		N/O	*Entrapment Protection
03.	IN	OUT		N/O	*Water Clarity	14.	IN	OUT		N/O	Facility Safety and Emergency Equipment; Plans
04.	IN	OUT	N/A	N/O	Chloramine; Stabilizer Control	15.	IN	OUT		N/O	Feature Safety
05.	IN	OUT		N/O	Contamination Control	16.	IN	OUT		N/O	Chemical Storage; Use
						17.	IN	OUT		N/O	Feature / Facility Lighting

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Inspection Results							
Bold= Critical (*) OUT = Not In compliance R = Repeat COS = Corrected on Site							
#	a/b/c	Code Reference	By Date	Location / Feature #	Description		
OUT	01	a	5.7.3.1.1	*	COS	Pool - 1	The free chlorine residual could not be measured. It was restored to 1.2 ppm by increasing rate of feed.
OUT	01	b	5.7.3.1.3	*	R /COS	Spa - 2	Bromine residual was measured at 1.4 ppm. It was restored to 4 ppm by increasing rate of feed.
OUT	02	a	5.7.3.5.4	*	R	Pool - 1	The pH was measured at 8.2. Acid supply was depleted at the time of inspection and pH could not be adjusted.
OUT	14	a	5.6.3.7.1		7 days	Bath House	Emergency telephone was disconnected.
OUT							

The inspection details are organized by **Category Number (#)**, the instance of duplication of this categorical violation (**a/b/c**), the specific **Code Reference** for comparison of the conditions described and the jurisdiction's standard that needs to be restored and the **Criticality (*)** of this violation as shown in MAHC. **Repeat (R)** of the same violation from the last inspection is also noted on the inspection results for "Out of Compliance" items. **Corrected on Site (COS)** indicates that the operator was able to remedy the out of compliance condition while the inspector was at the facility. That may adjust the follow-up interval needed, but does not erase the fact that the condition originally existed at the time of inspection. The **By Date** provides space for insertion of a specific date of correction required for the out of compliance condition. The **Location / Feature #** provides the specific location of the violation and links to the first table, if applicable, to the specific feature involved with the out of compliance item. It may be a general facility issue, also. **Description** should provide a sufficient description not only for the staff present, those staff members or owners not present and the swimming public to know what the out of compliance item entailed. It may also include the specifics of the COS actions. Finally, this detail report should be posted at the facility in a prominent public location and also made available to the public through means such as the agency's website.

Inspection Report Category and MAHC Section Cross Reference

#	Categories / Relevant MAHC Sections for Each Category / Bold= Critical		
Recreational Water Quality			
01.	*Disinfectant Residual		
	5.7.3 Disinfection		
02.	*pH Range		
	5.7.3 Disinfection		
03.	*Water Clarity		
	5.7.4 Water Quality		
04.	Chloramine; Stabilizer Control		
	5.7.3 Disinfection		
05.	Contamination Control		
	6.5.1 Contamination Response Plan 6.5.2 Water Contamination Response	6.5.3 Aquatic Feature Water Contamination Disinfection	6.5.4 Surface Contamination Cleaning and Disinfection
Personnel			
06.	*Management; Supervision; Training		
	6.1.1 Operator Qualifications and Certification	6.3.1 Operators: Staff Requirements & Availability	6.3.3 Staff Management
07.	*Lifeguard Services		
	6.2.1 Lifeguard Qualifications and Certification	6.3.2 Lifeguards: Staff Requirements & Availability	
Monitoring			
08.	Test Kit; Calibration; Monitoring Records		
	5.7.3 Disinfection	6.4.1 Operations	
Recirculation / Filtration / Disinfection / Chemical Feed			
09.	Recirculation Systems		
	4.7.1 Recirculation Systems and Equipment	5.7.1 Recirculation Systems and Equipment	
10.	Filtration Systems		
	4.7.2 Filtration	5.7.2 Filtration	
11.	Disinfection Systems		
	4.7.3 Disinfection	5.7.3 Disinfection	

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Safety		
12.	*Facility Enclosure: Entry Protection	
	4.8.6 Fencing	5.8.6 Fencing
13.	*Entrapment Protection	
	4.7.1 Recirculation Systems and Equipment	5.7.1 Recirculation Systems and Equipment
14.	Facility Safety	
	4.6.11 Telephone 5.6.5 First Aid Room 5.7.4.6 Water Temperature	5.6.6 Emergency Exit 6.3.3 Staff Management 6.4.2 Patron-Related Management Aspects
15.	Feature Safety	
	4.5.5 Depth Markings 5.5.5 Depth Markings	5.6.10 Spectator Areas 6.4.2 Patron-Related Management Aspects
16.	Chemical Storage; Use	
17.	Feature / Facility Lighting	
	4.6.1 Lighting	5.6.1 Lighting
Facilities		
19.	*Water Supply / Waste Disposal	
	4.11.1 Water Supply 4.11.2 Cross-Connection Control 4.11.4 Sanitary Wastes	4.11.5 Aquatic Feature Waste Water 5.11.1 Water Supply 5.11.2 Cross-Connection Control 5.11.4 Sanitary Wastes 5.11.5 Aquatic Feature Waste Water
20.	Restrooms; Diaper Changing; Other Facilities	
	4.6.7 Drinking Fountains 4.10.1 General 4.10.2 Location 4.10.3 Bathhouse Design 4.10.4 Fixture Requirements 4.10.5 Suits and Towels	4.10.6 Hose Bibbs 5.6.7 Drinking Fountains 5.10.1 General 5.10.4 Fixture Requirements 5.10.5 Suits and Towels 5.10.6 Hose Bibbs 5.10.7 Walls and Floors 5.10.8 Maintenance 5.10.9 Lavatory and Shower Water Temperature 5.10.10 Lavatory Supplies
21.	Facility Operation; Maintenance	
	4.1.1 Plan Submittal Process 4.1.2 Plan Content 4.1.3 Approval of Construction plan 4.1.4 Compliance Certificate 4.2 Materials 4.3 Equipment Standards 4.6.2 Ventilation 4.6.3 Electrical	4.6.4 Heating 4.8.1 Decks 4.9 Filter/Equipment Room 5.4.1 Reopening Procedures after Closure 5.4.2 Preventative Maintenance Plan 5.6.2 Ventilation 5.6.3 Electrical 5.6.4 Heating 5.6.8 Garbage Receptacles 5.6.9 Food and Drink Concession 5.6.10 Spectator Areas 5.8.1 Decks 6.4.1 Operations 6.4.2 Patron-Related Management Aspects
22.	Feature Operation; Maintenance	
	4.5.1 Shape 4.5.2 Access Ladders/Recessed Steps/Stairs 4.5.3 Color and Finish 4.5.4 Walls 4.8.2 Diving Boards and Platforms 4.8.3 Starting Blocks 4.8.4 Deck Slides 4.8.5 Lifeguard-Related 4.8.7 Aquatic Feature Cleaning System 4.11.3 Fill Spout 4.12.1 Spa Aquatic Features 4.12.2 White-Water Slides/Speed Slides/Drop Slides/ Inner Tube Slides/Mat Slides/Multiple Passenger Tube Slides 4.12.3 Wave Aquatic Features	4.12.4 Therapy Aquatic Features 4.12.5 Leisure Rivers 4.12.6 Movable-Bottom Aquatic Features 4.12.7 Rolling Bulkheads 4.12.8 Spray Grounds 4.12.9 Wading Aquatic Features 5.4.3 Aquatic Feature Operation – General 5.5.2 Access Ladders/Recessed Steps/Stairs 5.5.6 Aquatic Feature Shell Maintenance 5.8.2 Diving Boards and Platforms 5.8.3 Starting Blocks 5.8.4 Deck Slides 5.8.5 Lifeguard-Related 5.8.7 Aquatic Feature Cleaning System 5.11.3 Fill Spout 5.12.1 Spa Aquatic Features 5.12.2 White-Water Slides/Speed Slides/Drop Slides/ Inner Tube Slides/Mat Slides/Multiple Passenger Tube Slides 5.12.3 Wave Aquatic Features 5.12.4 Therapy Aquatic Features 5.12.5 Leisure Rivers 5.12.6 Movable-Bottom Aquatic Features 5.12.7 Rolling Bulkheads 5.12.8 Spray Grounds 5.12.9 Wading Aquatic Features

Note: Each 'Out of Compliance' finding in the report detail section should reference a particular MAHC requirement. Additional detail on the MAHC sections in each category can be found in the MAHC *Strawman* or outline online at <http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-strawman.pdf>. The final MAHC should also be consulted for placement of each MAHC requirement.

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Form 2: Drowning and Near-Drowning Investigation Tool

Drowning and Near Drowning Investigation Tool

Facility Name: _____

County: _____

Circle Type of Incident Drowning Near Drowning

Date of Incident: ____ / ____ / ____

Victim, Family, and Close Contact Interview Tool

Victim Information (Use separate tools for each victim and/or person interviewed)

Victim's Name: _____ Age: _____ Date of Birth: ___/___/___

Address: _____ Height: _____ ft _____ in Weight: _____ lbs.

_____ Gender: Male Female

_____ Ethnicity: Caucasian Black
 Hispanic Other _____

Source of Information: _____

Address: _____ Phone: _____

_____ Relationship to Victim: _____

Victim Abilities and Behaviors:

Swimming Ability:

Non-swimmer Beginning/ Poor Swimmer Describe: _____

Did victim take swim classes? Yes No

If yes, what classes? _____

Knowledge of Facility:

✓ Was this the victim's first time at the facility? Yes No (# of prior visits _____)

✓ Was this the victim's first time swimming at the facility? Yes No (# of times swimming _____)

Victim Behaviors:

✓ Did the victim like to be in the water? Yes No

✓ Did the victim usually enter deep water? Often Sometimes Never

✓ Did the victim usually engage in physical activity? Often Sometimes Never

✓ Did the victim usually engage in risky activities? Often Sometimes Never

✓ Did the victim usually comply with commands from parents / counselors / lifeguards? Always Often
 Sometimes

✓ Who was at the facility with the victim? _____

Where were they at the approximate time of the incident? _____

Medical History / Health Information:

✓ Was the victim known to suffer from a seizure disorder? Yes No Unknown

➤ If yes, did the victim use medications to control seizure occurrence / severity? Yes No Unknown

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- ✓ Was the victim known to have any heart conditions? Yes No Unknown
 - If yes, did the victim use medications for the condition? Yes No Unknown
 - Were the medication(s) effective? Yes No Unknown
 - Were the medication(s) taken on the day of incident? Yes No Unknown

- ✓ Was the victim known to suffer from Long QT Syndrome? Yes No Unknown
 - Was the victim known to have unexplained fainting or near drowning or other accidents? Yes No Unknown
 - Did anyone in the victim's family suffer from Long QT Syndrome or have unexplained fainting or unexplained near drowning or other accidents? Yes No Unknown

- ✓ Did the victim have any other known medical conditions or physical or mental disabilities?
 Yes (please specify) No

- ✓ Was the victim known to be using any prescription or non-prescription medications?
 Yes (please specify medication and indicate reason for medication) No

- ✓ Did the victim take the medication(s) on the day of the incident? Yes No Unknown

- ✓ Did the victim suffer any illnesses or injuries in weeks prior to the incident? Yes (please specify) No Unknown

- ✓ Did the victim complain of any injury, illness, discomfort or general malaise on the day of the incident?

Yes (please specify) No

Activities Prior to Incident:

- ✓ Time victim arrived at facility ____:____ AM PM
- ✓ Time victim entered water ____:____ AM PM
- ✓ Time victim was last seen ____:____ AM PM

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List the victim's activities on the day of incident (including time prior to arriving at the facility). Include time and duration of: Meals or Snacks, Physical Activity such as Sports or Work, Extensive Travel, etc. Specify the nature of each activity. For meals and snacks, list the foods eaten.

Start Time	End Time	Activity
____:____	____:____	_____
____:____	____:____	_____
____:____	____:____	_____
____:____	____:____	_____
____:____	____:____	_____

✓ Did the victim consume alcohol or use any drugs (other than medications) on the day of the incident?

Yes (please specify drug type, amount, and time consumed/taken) No Unknown

Family Contact Information:

Name	(relationship to victim)	Address	Phone:
1 _____	(_____)	_____	(____) _____-_____
2 _____	(_____)	_____	(____) _____-_____
3 _____	(_____)	_____	(____) _____-_____
4 _____	(_____)	_____	(____) _____-_____
5 _____	(_____)	_____	(____) _____-_____
6 _____	(_____)	_____	(____) _____-_____

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Facility and Incident Information Collection Tool

Facility Name: _____ Address: _____

City/Town Village: _____ County: _____

Operation Type:

- Part 6 -** Aquatic Park Health Club Apartment Complex
 Homeowners Assoc Municipality School
 Other: _____

-
- Part 7 -** Temporary Residences Children's Camp Campground

-
- State Operated -** OPRHP DEC State Institution

Facility Type:

- Beach -** Stillwater Surf Tidal/Current Other: _____

- Pool -** Outdoor Indoor Wading Pool Spa Pool Wave Pool

- Other: _____

Video Surveillance:

- ✓ Does the facility use video surveillance for the bathing area? Yes No
 ➤ If yes, was video footage of the bathing area at the time of the incident obtained? Yes No

Physical Characteristics:

(Include a sketch with dimensions indicated on the sketch)

- ✓ Indicate dimensions of pool or beach swim area: _____ X _____ feet yards (circle one)

- ✓ Indicate maximum depth of pool or beach swim area: _____ feet

- ✓ Indicate the bather capacity of the facility: _____

- ✓ Describe the pool/beach bottom slopes (rise/run) and beach underwater topography (when applicable):

- ✓ List the depth of the water at all float-lines:

- ✓ Indicate presence or absence of depth, breakpoint markings and other markings or hazardous bottom conditions (drop-offs, holes, weeds, etc.) at bathing beaches:

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✓ If there are changes in bottom slope, where are they in relations to the float lines? _____

Supervision:

- ✓ What Level of Supervision is required by Code? (Select one) I IIa IIb III IV Level IV (TR / CG)
- ✓ Based on facility size and characteristics, indicate the required number of lifeguards required by Code _____
- ✓ Indicate the number of lifeguards providing supervision at the time of the incident. _____
- ✓ For each lifeguard on duty during the incident, list his or her name, age, number of years of experience and current certifications. Attach copies of the certifications for each lifeguard as an appendix. Under each certification heading, list the certifying agency (i.e., ARC, AHA, Ellis & Assoc., etc.)

Lifeguard Name	LG Age	Yrs Exp	LG Cert	CPR Cert	Waterfront Cert	Surf Cert	1 st Aid Cert

✓ Indicate each lifeguard's uncorrected vision:

Lifeguard Name	Uncorrected vision

✓ Indicate other findings pertaining to eye sight including the use of glasses, contacts and binoculars: _____

✓ Where were lifeguards positioned at time of the incident? Describe below and attach a sketch as an appendix.

✓ Were lifeguard chairs provided? Yes No (If yes, add to sketch)

✓ If present, were they fixed or moveable? Fixed Moveable Both

✓ Was this consistent with the approved safety plan? Yes No

✓ From lifeguard interviews, describe the manner in which lifeguard rotations or chair changes were performed the day of the incident. Be sure to determine if/how continuous supervision of bathers is provided during rotations.

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- ✓ What was the approximate length of time between the last lifeguard rotation and the occurrence of the incident? Attach a schedule of lifeguard chair rotations and breaks for the day of the incident.

Supervision Level III Compliance: (If not applicable, please go to the next section)

- ✓ Where was Supervision Level III staff positioned at the time of the incident? _____

- ✓ When applicable, did Supervision Level III staff possess CPR training? _____

Supervision Level IV Compliance: (If not applicable, please go to the next section)

- ✓ Describe how patrons are informed of the supervision provided at the bathing facility: _____

- ✓ Obtain a copy of written information/brochure provided to patrons. Does information comply with SSC requirements? _____

- ✓ Was the required sign posted at bathing area? _____

- ✓ Was the facility compliant with the use rules, including two adults being present with one remaining on the deck/beach at all times? _____

- ✓ Were children under 16 accompanied by a parent or guardian? _____

- ✓ Did the Supervision Level IV staff complete daily visual check and sign the required log? _____

- ✓ When required, did the Supervision Level IV staff possess CPR? _____

Environmental Conditions:

- ✓ Time of incident ____:____ AM PM

- ✓ Air Temperature _____ ° F

- ✓ Water Temperature _____ ° F

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- ✓ Weather Conditions _____
- ✓ Wind: Calm Light Breezes Light Wind Gusty Persistent Wind
- ✓ Water Surface: Calm Small Ripples Choppy Heavy Waves/Surf (Wave Height _____)
- ✓ Current/Tide: Stillwater Light Moderate Strong Current Rip Current High Tide Low Tide
- ✓ Current direction (if applicable) _____
- ✓ Water clarity to _____ feet-deep
- ✓ Pool main drain visible? Yes No N/A (beach)
- ✓ Did glare impact the ability to see/supervise bathers? Source of info _____
 Yes (describe) No

- ✓ Water Depth: (complete as many as possible)
 - Maximum depth at facility _____ feet deep
 - Where victim was last seen _____ feet deep Information source _____
 - Where victim was recovered _____ feet deep Information source _____
- # of patrons at facility at time of incident _____ # of bathers in water at time of incident _____

Safety Plan

- ✓ Did the facility have an approved safety plan on file with the local health department? Yes No
- ✓ Date Plan was received _____ Date of most recent Approval/Review _____
- ✓ Was the facility's approved safety plan implemented, including supervision of bathers and emergency response? Yes No (If no, describe any deviations from the safety plan)

Emergency Response

Agency Name / Phone Number	Time of arrival on scene
Police _____	____:____ <input type="checkbox"/> AM <input type="checkbox"/> PM
Fire Department _____	____:____ <input type="checkbox"/> AM <input type="checkbox"/> PM
Ambulance _____	____:____ <input type="checkbox"/> AM <input type="checkbox"/> PM
SCUBA _____	____:____ <input type="checkbox"/> AM <input type="checkbox"/> PM
Other _____	____:____

AM PM

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Witness Interview Tool

Witness name: _____ Phone Number: _____
Address: _____ Relationship to Victim: _____

✓ Estimate time of incident: ____:____ AM PM

✓ How long was the witness at the facility prior to the incident? _____

✓ Describe witness location at the time of the incident: _____

✓ How many times has the witness been to the facility? _____

✓ Describe the witness' observations and association with the victim and/or facility: _____

✓ Where were lifeguards positioned at time of the incident? Describe below and attach a sketch as an appendix.

Provide witness statement about the approximate length of time between the last lifeguard rotation and the occurrence of the incident.

✓ Describe witness statement about lifeguard response to the incident: _____

Environmental Conditions:

✓ Time of incident ____:____ AM PM

✓ Air Temperature _____ ° F

✓ Water Temperature _____ ° F

✓ Weather Conditions _____

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- ✓ Wind: Calm Light Breezes Light Wind Gusty Persistent Wind
- ✓ Water Surface: Calm Small Ripples Choppy Heavy Waves/Surf
- ✓ Current/Tide: Stillwater Light Moderate Strong Current Rip Current High Tide Low Tide
- ✓ Current direction (if applicable) _____
- ✓ Water clarity to _____ feet-deep
- ✓ Pool main drain visible? Yes No
- ✓ Did glare impact the lifeguard's ability to supervise bathers?
 Yes (describe) No _____

- ✓ Water Depth: (complete as many as possible)
 - Where victim was last seen _____ feet deep
 - Where victim was recovered _____ feet deep
- ✓ # of patrons at facility at time of incident _____ # of Bathers in water at time of incident _____

Emergency Response

- ✓ Time of Incident ____:____ AM PM
- ✓ Time victim was brought to shore / poolside ____:____ AM PM Source of information _____
- ✓ Duration of submersion _____ minutes
- ✓ Orientation of the victim when found in water
 - Face-up Face-down Eyes open Eyes closed
 - Facing shore Facing away from shore Parallel to shore
 - On Surface On Bottom Floating _____ feet under the surface
- ✓ Describe the condition of the victim when pulled from water. Include skin and lip coloration and temperature, absence/presence of breathing and pulse.

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Proposed Filter cleaning options:

<input type="checkbox"/>	Cartridge filters	Provide a curbed area that flows into a sanitary sewer. Location: _____
<input type="checkbox"/>	Sand filters	Provide an approved sanitary sewer connection with air gap. Waste line size: _____; Sump Size: _____
<input type="checkbox"/>	Diatomaceous filters	Provide separation tank Make: _____; Model: _____

<p>Schematic diagram of proposed equipment layout:</p> 	<p>Description of additional changes (i.e., plumbing, electrical, structural, etc.):</p>
--	--

Business or individual doing work:

Contractor Name:	_____
Business Name:	_____
Address:	_____

Phone and FAX number(s):	_____
Email address:	_____
Contractor's License number:	_____

Minor remodel approved by:	Date:
----------------------------	-------

Comments:

A fee will be charged for the plan review of this application. Contact (XXX)XXX-XXXX for more information.

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