Regulatory Compliance and Best Practices for Aquatic Facility Owners, Managers and Operators

Presented by Angelo Sfarra, CPO Environmental Health Specialist & Rich Pugh, CPO Environmental Health Program Manager

PA Department of Health - Pool School
DOH Public Bathing Place Program

Regulatory requirements

- PA Public Bathing Law
  - Operating Permit Required
  - Grants PA DOH inspection & enforcement powers
- PA Code Title 28, Chapter 18 (regulations)
  - Operating Requirements

Current Design Standards/Best Practices

- International Swimming Pool and Spa Code (ISPSC)
- Model Aquatic Health Code (MAHC)

www.health.pa.gov
Health > All Health Topics > Programs > Bathing Places
The purpose of the Pennsylvania Bathing Code, by which all public Pennsylvania pools, beaches, and spas are regulated, is “...to protect the public health through the proper design, operation and maintenance of public bathing places.”

- **Title 28, Chapter 18.4** requires that a “capable manager shall be responsible for the proper maintenance and use of the bathing place...by keeping it in good repair and in a clean, sanitary and healthful manner, so that it does not constitute a menace to public health...and is not a public nuisance.”

- Our program strongly recommends a facility be managed by a [Certified Pool Operator (CPO)](https://www.nspcco.org) or [Certified Aquatic Facility Operator (AFO)](https://www.nspcco.org).
Code defines manager/operator as "capable" meaning they must have specific knowledge to:

- **Complete accurate chlorine and pH testing** using proper test kit, recording those result, and recognize the need to make chemical adjustments.

- **Competency to adjust pH and chlorine levels** (may require immediately closing the pool). Pennsylvania Department of Agriculture (PDA) requires a **Cat. 24 Certified Pesticide Applicator License** for operators making chlorine applications.

- Understand what a positive coliform/E.coli test indicates and be **competent to follow Operational & Biological Contamination Protocol recommendations**.

- **Know what steps to take** if the water becomes cloudy, entrapment hazards etc., and be knowledgeable of all protocols for emergency response (that may include procedures for pool closure/evacuation).
Permitting Process

- **Application**
  - Completed Permit Application Form
  - Supporting documentation
  - Permit Application Fee

- **Supporting Documentation**
  - Construction Permit and Approved/Signed blueprints
  - Sanitary Survey Report (beaches only)
  - Electrical Inspection Certificate
  - Category 24 Pesticide Applicator License
  - Most recent bacterial test report

- **DOH Permit Inspection prior to issuing permit**
- **Permit to operate issued prior to opening**
Public Bathing Place Program – PA DOH Inspection Goals

- Enforce Chapter 18 Regulations & Pennsylvania Public Bathing Law
- Identify / report operation violations
- Provide consultation & guidance to operators
- Achieve compliance to ensure public health & safety
Public Bathing Place (PBP) Inspections

- Permit
- Complaint
- Enforcement
- Routine
• Public Bathing Place Operating Permit
• PA Code Title 28, Chapter 18
  ▪ Electrical Inspection certificate
  ▪ Lifeguard certificate (copies) for Recreational Swimming Establishments (RSE)
  ▪ Bacteriological Lab Reports
  ▪ Daily Logs
• Facility use rules
  ▪ Include bather load
• Emergency Contact Info/Procedure
  • Lifesaving equipment, First Aid Kit, Phone
• Pesticide applicator license (Cat. 24)
# PBP Inspection Report

## Public Bathing Place Report

### Facility Name: ____________________________

### I.D. No.: ____________________________

### County: ____________________________

### Municipality: ____________________________

### Date: ____________________________

### Facility Location/Address: ____________________________

### Operators Name: ____________________________

### Telephone Number: ____________________________

### Permit Holder’s Name: ____________________________

### Reason for Report: ____________________________

- Annual
- Complaint
- Enforcement
- Location
- Indoor
- Outdoor

### Permit Holder’s Address: ____________________________

### Type of Unit: ____________________________

- Pool
- Water Park
- Spa
- Beach
- Spray ground

### Bathing Water Monitoring Locations: ____________________________

### Acceptable pH: ____________________________

### Disinfectant: ____________________________

- Gas Chlorine
- Sodium Bicarbonate
- Chlorine
- Sodium Hypochlorite
- Calcium Hypochlorite
- Sodium Chlorite
- Dichlor
- Sodium Bicarbonate
- pH Decreaser
- Chlorine Generating (Salt)
- Muriatic Acid

### Pool Chemicals Used: ____________________________

### Electrical Inspector: ____________________________

### Chemical Testing Company: ____________________________

### Bathing Water Source: ____________________________

### Electrical Certificate Expiration Date: ____________________________

### Present Bather Load: ____________________________

### No. of Lifeguards on Duty: ____________________________

## Violations

<table>
<thead>
<tr>
<th>Violations</th>
<th>C</th>
<th>NC</th>
<th>NA</th>
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<tbody>
<tr>
<td>Lifeguards</td>
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<tr>
<td>Disinfection</td>
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<td>Bathing Water Quality</td>
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<tr>
<td>Electrical Safety Hazard</td>
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<td>Structural Safety Threat</td>
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<tr>
<td>Drinking Water Supply</td>
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<tr>
<td>Electrical Certificate</td>
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<tr>
<td>Sewage Disposal</td>
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<tr>
<td>BP Bact. Monitoring/Records</td>
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<tr>
<td>Nuisance/Hazards</td>
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<tr>
<td>Gas Chlorination Equipment</td>
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<tr>
<td>Class I, II, III</td>
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<td>Plumbing/Crossconnections</td>
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<tr>
<td>C = Compliance</td>
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<td>NC = Non-compliance</td>
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<td>NA = Not Applicable</td>
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</table>

## Violation

**VIOLATION**

1. Provide adequate number of qualified lifeguards/valid number of lifeguard certificates/record cards.
2. Maintain adequate disinfection levels in pools.
4. Electrical safety.
5. Pool construction and/or its equipment does not pose threat/danger to the health or safety of bathers.
6. Provide safe/adequate drinking water supply.
7. Valid Electrical Certificate.
8. Provide an approved sewage and waste water disposal system.
9. Monitor for bacterial quality and maintain records of laboratory results.
10. Operate and maintain in a manner to reduce hazards.
11. Maintain separate room for gas chlorination/adequate breathing equipment for chlorine atmosphere/minute of cylinder and automatic exhaust ventilation.
12. Provide measuring (adequate number of reaching and flotation devices) and first aid equipment.
13. Provide approved plumbing, cross-connection control, and backflow prevention.
14. Obtain permits/certificates to permit and permit specifications.
15. Provide complete residual disinfection and pH monitoring test kits.
16. Maintain hygiene and communicable disease protection.
17. Provide a capable manager as evidenced by maintaining a clean, sanitary, healthful, and menace free facility.
18. Satisfactory garbage and refuse handling.
19. Control arthropods and rodents.
20. Provide sufficient lighting, ventilation and heating.
22. Maintain and submit daily records.
23. Post Chapter 18 and Public Bathing Place Certificate.

**REGULATION REFERENCE**

- 18.50
- 18.55
- 18.56
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- 18.101
PBP Inspection Check List – Chapter 18

- Lifeguard Requirements
- Disinfection (Cl₂/Br₂)*
- Bathing Water Quality*
- Accurate Test Kits*
- Daily Logs (pH, Cl₂/Br₂)*
- Bacteria Monitoring Records*
- Electrical Safety Hazard
- Electrical Certificate*
- Structural Safety Threat
- Nuisance/Hazards
- Lifesaving Equipment*
- Permit/Permit Specifications
- Facility Management
- Waste Management
- Vector/Pests
- Lighting & Ventilation
- Cross-connection & Plumbing
- Drinking Water Supply
- Dressing/Toilet Facilities
- Permit & Chapter 18 Posted

* Critical Provisions
Lifeguard Requirements – Certification

• A **certified lifeguard** shall mean an individual who has a current certification in lifeguarding from a certifying authority recognized by the department in a notice published in the Pennsylvania Bulletin.

• **Who must have certified lifeguards?** Any “recreational swimming establishment” defined as a facility that is designed for the primary purpose of swimming, where a fee is charged for admission.

• Lifeguard Requirements Q/A and Recognized Authorities for 2021 available on [DOH website](#).
How many certified lifeguards are required at a recreational swimming establishment?

- At least one certified lifeguard for every 4,000 square feet of water surface area, plus one certified lifeguard for any fraction thereof, equal to or greater than 1,000 square feet, shall be on duty at the waterside;
- At least two lifeguards present and available when open to general public;
- During special events in which the use of the recreational swimming establishment is restricted, at least one certified lifeguard, whose sole duty is to protect the bathers, shall be present at waterside during the event;
- When a wading pool is open, the certified lifeguard shall have an unobstructed view of the entire wading pool from the lifeguard’s assigned station. If the certified lifeguard does not have an unobstructed view, an additional certified lifeguard shall be on duty to guard only the wading pool;
- If a diving board or water slide is present, a certified lifeguard shall be on duty to monitor the diving well or slide catch area.
§ 18.29. Disinfection of pool water

Chlorine Residual (required)
- 0.4 ppm PA regulatory minimum, 1 ppm rec. minimum per MAHC
- No maximum in PA code, however...
- Over 10 ppm free chlorine = potential hazard to bathers, DOH recommends temporary closure
- 2 – 4 ppm ideal range

pH Value
- 7.2 minimum, 8.2 maximum by PA regulation
- 7.2 – 7.6 ideal range
# Types of Chlorine

<table>
<thead>
<tr>
<th></th>
<th>Gas Chlorine</th>
<th>Sodium Hypochlorite</th>
<th>Calcium Hypochlorite</th>
<th>Dichlor *</th>
<th>Trichlor *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Appearance</strong></td>
<td>Gas</td>
<td>Liquid</td>
<td>Granular &amp; Tablet</td>
<td>Granular</td>
<td>Granular &amp; Tablet</td>
</tr>
<tr>
<td>% Available Chlorine</td>
<td>100%</td>
<td>12-15%</td>
<td>65-70%</td>
<td>56-62%</td>
<td>90%</td>
</tr>
<tr>
<td>pH Effect</td>
<td>Lowers pH &lt;1.0</td>
<td>Raises pH 13</td>
<td>Raises pH 11.8</td>
<td>Neutral pH 6.9</td>
<td>Lowers pH 2.9</td>
</tr>
<tr>
<td>Loss to Sunlight</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

* Outdoor use only
Chlorine Applications to Water

Pool Closure

- Chlorine Feed is damaged
- Chlorine Feed is malfunctioning
- Chlorine Feed is missing
• **pH** is the single most important element in swimming pool water chemistry

• **pH** is a measure of acidity/hydrogen ion (H+) concentration of the water:
  - **Acidic**: 0-6
  - **Neutral**: 7
  - **Basic**: 8-14
# pH Effects on Water Quality

<table>
<thead>
<tr>
<th>Water Quality</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Poor Cl disinfection</td>
<td>&gt; 8.0</td>
</tr>
<tr>
<td>• Eye irritation</td>
<td></td>
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<tr>
<td>• Skin irritation</td>
<td></td>
</tr>
<tr>
<td>• Ideal for disinfection</td>
<td>7.2 – 7.6</td>
</tr>
<tr>
<td>• Ideal for eye/skin comfort</td>
<td></td>
</tr>
<tr>
<td>• Eye irritation</td>
<td></td>
</tr>
<tr>
<td>• Skin irritation</td>
<td></td>
</tr>
<tr>
<td>• Pipe corrosion</td>
<td>&lt; 7.0</td>
</tr>
</tbody>
</table>
Pool Water Testing
§ 18.29. (c) Testing kits shall be provided for making the necessary tests for residual disinfection and pH. The kit for disinfectant residual shall be accurate within 0.1 milligram per liter of chlorine or equivalent. The pH kit shall be accurate within 0.2 pH units.
DOH requires this method of testing; measures free chlorine residual to 0.1 PPM using FAS-DPD Titration method with 50 mL sample

- Reagents are highly stable
- Easy to use - Titration turns water sample from pink to clear, less subjective to the user’s eye than colorimeter match

DPD (diethyl-p-phenylene diamine)
• **pH** – Most use phenol red
  - Limit to 6.8 – 8.2
  - Make sure you have proper color comparator for test kit reagents

• Purchase all kit reagents from same manufacturer

• All must be stored out of heat and sunlight

• **Replace reagents** every 6 months – 1 year maximum, or by expiration date/best by date printed on label
• Test and log disinfectant and pH **twice per day** minimum, required by reg.

• Bather load, flow rate, fresh water or chemicals added, backwash, pool closure, etc.
§ 18.25. Clarity of the pool

“A black disc, 6” in diameter on a white field, when placed on the bottom of the pool at the deepest point, must be clearly visible from the deck around the deep area of the pool.”

Rule of Thumb – if you can’t see the bottom drain the pool fails clarity standard and must be closed.

Pennsylvania Department of Health
§ 18.42 (c) (2) The bather load of the swimming facility may not exceed the maximum bather load as defined in the permit application.

• Bather load determination based on ISPSC Code, formula found within.

• Bathers shed concentrations of bacteria on the order of 600,000 to 6,000,000 colony forming units (CFU) per person in the first 15 min of an exposure period.
§ 18.30. Water samples.

- (c) The permittee shall have a bacteriological analysis made at least **once each week**

- Analysis of water samples shall be performed at an **accredited environmental laboratory** registered with the Department of Environmental Protection for drinking water

- **Total Coliform < 2cfu/100mL** (Treated water only)

- Weekly laboratory records must be kept on site for **at least two years** by regulation.
Positive/Failed Bacteria Result

DOH Contamination Protocols
Weekly Bacteriological Test Failure Treatment

- **Close the aquatic facility** including all units that share the same water.
- Communicate with patrons about length and nature of closure.
- If applicable, manually remove fecal matter and dispose in a sanitary facility.
- Disinfect the removal device.
- **Bring cyanuric acid level to less than 15 ppm** by partial water changes.
- **Bring pH to 7.2-7.5.**
- **Maintain 5-10 ppm residual free chlorine for 30 minutes.**
- Confirm filtration and turnover are at required rates during chlorination time.
- **Bring water chemistry back to recommended operational levels.**
- **Log the events**, date, remedial procedures, pH, and chemical levels used during enhanced treatment.
- **Reopen the unit(s).**
## DOH Contamination Protocols

<table>
<thead>
<tr>
<th>Formed Stool Incident</th>
<th>Unformed Stool Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Crypto risk unlikely</td>
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<tr>
<td>• 5 ppm free chlorine**</td>
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<tr>
<td>• 30 minutes minimum</td>
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<tr>
<td>• DOCUMENT all steps specifically chlorine &amp; pH readings</td>
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<tr>
<td>• Crypto risk very high</td>
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<tr>
<td>• 20 ppm free chlorine**</td>
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<tr>
<td>• 12.75 hours minimum</td>
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<tr>
<td>• DOCUMENT all steps specifically chlorine &amp; pH readings</td>
<td></td>
</tr>
</tbody>
</table>

**Stabilizer/cyanuric acid levels must remain < 15 ppm**
PA Regulations require Bacteria testing of Beach water:

- Within 1 week prior to opening, and once a week during period of use
- DOH may require additional samples based on size, bather load, weather conditions, bacteriological history or other factors that may influence water quality
- Each sample is to be tested individually for E.Coli
  - E.Coli density may not exceed 235 per 100ml
  - 30-day geometric mean not > 126 per 100ml
Beach Closure Requirements

§ 18.28. Bathing beach contamination

• Prominently post signs at all entrances to the bathing beach area informing the public that the bathing beach is closed and that swimming or bathing is prohibited
• Investigate reason for exceedance and document
• Resample immediately
• Notify DOH or local health department of new result
• Receive written authorization from DOH/local health department to reopen beach
• The approval to reopen will be given by DOH when the Department finds that the waters of the bathing beach are no longer contaminated.
Electrical Safety Hazard

Three of the biggest electrical safety hazards, especially in older pools:

• faulty underwater lighting
• faulty or nonexistent Ground Fault Circuit Interrupters (GFCIs)
• damaged wiring.

Grounding & Bonding of pool electrical equipment required to prevent electrical shock.
• All units must comply with National Electric Safety Code
• Inspection of all electrical pool equipment is required every three years
• Licensed PA contractor certified to perform work in your county & recognized by PA Department of Labor & Industry (DLI)

DLI > Uniform Construction Code > Certified TPA (Buildings)
Examples:

- Missing or broken tiles, cracked coping or basin, excessive pitting, damaged pool deck etc.
§ 18.41. Reduction of hazards.

...To reduce to a practical minimum the danger of injury to persons from drowning, falls, collisions, fires, nuisances or hazard of any kind.

- Mishandling/improper storage of chemicals
- Excessively high levels of chlorine
- Excessive hot tub/spa temperature (>104 deg F)
- Pool room left unsecured, locks not functioning
- Loose, broken or missing ladders or handrails
- Tripping hazards, etc.
§ 18.43. Lifesaving equipment.

1. Reaching Device
2. Floatation Device
3. First Aid Kit

**Emergency Use only**
1. Operational

- Obtain permit to operate from PA DOH
- Appropriate use of disinfectant based on unit location and use with proper feeder equipment
- Circulation- 24/7
- Turnover period / Flow Rate
# Turnover Times

<table>
<thead>
<tr>
<th>Permitted Unit Type</th>
<th>Turnover Time (Hours, Maximum)</th>
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</thead>
<tbody>
<tr>
<td>Swimming Pool</td>
<td>6&lt;sup&gt;A&lt;/sup&gt;, 8&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>Wading Pool</td>
<td>1&lt;sup&gt;A&lt;/sup&gt;, 2&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>Spa/Hot Tub</td>
<td>0.5&lt;sup&gt;A&lt;/sup&gt; (30 minutes)</td>
</tr>
<tr>
<td>Splash Pad (less than 24 inches)</td>
<td>1&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>Catch Pool (Water Slide)</td>
<td>1&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>Leisure River</td>
<td>2&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

A) Max. turnover based on ISPSC build standard and/or MAHC  
B) Max. turnover by PA Code
2. **Changes/alterations**
   - Equipment changes, unit modifications, etc.

**Public Bathing Place Application to Operate Equipment Changes**

- Form to be used for Department review and approval of changes to equipment, outside of regular maintenance only.
- Filters, chemical feeders and chemical controls, circulating pumps, and flow meters.
- Must include a copy of your current Electrical Certificate.
3. Maintenance

- Proper function of essential circulation and disinfection equipment
- Pump function, piping integrity, leaks, etc.
Waste Management and Vector Control

Garbage and Refuse

§ 18.91. Collection
The collection of garbage and refuse shall be conducted in a sanitary manner and as often as necessary in order to prevent a nuisance.

§ 18.92. Storage.
Other refuse shall be stored... in a manner so as to prevent arthropod or rodent problems and other nuisances.

§ 18.93. Disposal.
The disposal facilities shall be operated and maintained in a manner that does not create a nuisance or health hazard.

§ 18.6. Vector control.
Adequate measures for the control of arthropods and rodents which the Department deems a public health hazard shall be taken...
§ 18.65. Lighting.

Sufficient lighting shall be provided to promote cleanliness.

§ 18.66. Ventilation and heating.

Ventilation and heating shall be such as to provide for the comfort of the bather.
**Air Handling and Water Quality**

**Recommendations:**

1. **Automatic chlorine control system.** The chemical feed pump must be sized to match worst case pool loading.

2. **High water turnover** to better mix the pool, to avoid dead spots, and to provide better chlorine concentration measurement and control.

3. **ASHRAE 62 outdoor air compliance** to aid in breakpoint chlorination. Consult with your technical advisor.

4. **Add chlorine deactivating filters** to help balance energy, humidity and water chemistry demands.

- ASHRAE recommends replacing the indoor air once per hour.

- ASHRAE requires that relative indoor humidity remain below 60 percent.
§ 18.56.(b) Drinking water facilities shall be provided at public bathing places.

§ 18.62. Bather preparation facilities shall be provided with dressing facilities, showers, lavatories, and toilets.
§ 18.72. Cross connections.
- Cross connections are not permitted.
- A minimum air gap of at least twice the diameter of the water pipe is provided where pool water or water from the recirculation system is discharged to a sewer system.

§ 18.73. Backflow prevention.
- Backflow is not permitted.
- Where it is not practicable to provide the minimum air gap, the connection to the fixture, equipment or appliance shall be equipped with a backflow preventer assembly.
§ 18.2. Posting of regulations.

A copy of this chapter, as well as the Certificate for Bathing Place, shall be posted conspicuously at the public bathing place for the information of the public.
Best Practices - Daily Check Lists

- Pool Chemistry
- Log Entries
  - Record all daily readings and chemical adjustments
- Filter Room
  - Feeder/ Filters Equipment Pumps and Chemical Storage/PPE
- Safety Features
  - Life saving equipment
  - Ride/Pool Rules
- Deck and Deck Equipment
  - Depth markers/warning signs
  - Free from structural hazards and obstructions
- Pool Cleaning
  - Clarity, skimming, water levels, stains, non-slip tile surfaces
- Emergency Response Systems
Best Practices - Emergency Response

• Develop Emergency Response Plan
  ◆ Spill-cleanup
  ◆ Chemical accident/exposure response
  ◆ Clear chain of command w/ alternates
  ◆ Evacuation Plan
  ◆ Communication plan alerting patrons, staff & emergency responders

• Practice Drills and Organizational Response
• Review and Update
Regulatory Compliance and Best Practices for Aquatic Facility Owners, Managers and Operators

Questions?

THANK YOU!