

Pool Operator's Training Course

Handouts

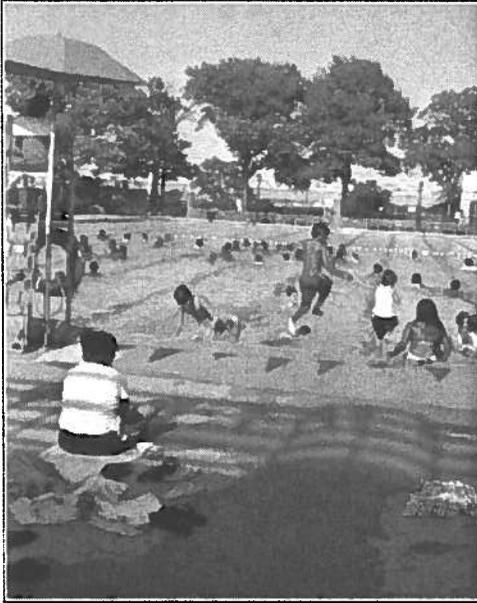
**Hood River County Health Department:
Environmental Health Office**

541-387-6885

2013

A Brief History of Municipal Swimming Pools

June 1st, 2012 | posted by Fred Reiff PE in Pools



Lyons Pool is a popular municipal pool in Tompkinsville, Staten Island, NY, and an official New York City landmark. Constructed by the Works Progress Administration, it is one of eleven pools that opened throughout New York City in a single summer during the Great Depression (New York City Parks & Recreation [website](#)).

Photo courtesy of the Staten Island Advance.

Municipal swimming pools have evolved for more than 150 years from little more than public baths for the urban poor to the well-designed and scientifically operated facilities we know today. Author Jeff Wiltse documents the evolution of the public swimming pool in America in his 2007 book, *Contested Waters: A Social History of Swimming Pools in America*. Wiltse focuses on how US swimming pool history reflects changing social dynamics in America, including the erosion of Victorian culture, the emergence of popular recreation, and the racial integration of public spaces. It is a fascinating and insightful read, not only from the sociological standpoint, but also from the perspective of advancements in swimming pool technology.

Boston Pioneers with “River Baths”

Because cholera was thought to be associated with poor human hygiene in 1862, in the summer of that year the city of Boston opened six “river baths” in hope of preventing cholera outbreaks. The baths were enclosed structures housing large wooden tank-like pools submerged into the Charles River. River water circulated naturally between wooden boards spaced inches apart. Wiltse reports these popular baths attracted children and adults alike.

Six years later in 1868, Boston opened the first real municipal pool facility in the United States on Cabot Street in Roxbury. The facility featured two 20’ X 24’ pools, one for males and one for females. The goal was cleanliness for working men. “Bathers plunged their dirty bodies into the water and rubbed their skin clean,” says Wiltse, but, instead of serving mainly working men, children accounted for nearly 97 percent of the baths. Additionally, with water disinfectants not yet a reality, pool water had to be refreshed frequently by emptying and refilling, a significant cost that probably contributed to the facility closing after just eight years.

Municipal Pools Come of Age

Fast-forward to the 1920’s when Americans began to earn more and work less. The average work week had declined from 55 hours per week in 1910 to 48 in 1920. Suddenly Americans had more time for leisure activities, including swimming. According to Wiltse, pool construction accelerated and pool equipment businesses grew up. Swimming pool chlorination began, and public officials and newspapers aggressively publicized pool sanitation measures to alleviate long-standing fears of waterborne illnesses.

The swimming pool boom lasted until 1929 and the start of the Great Depression. It was reinvigorated in late 1933 when the US government initiated large civil works projects to put Americans back to work. Wiltse states that between 1933 and 1938, the federal government built almost 750 “New Deal” swimming pools and remodeled hundreds more. At that time pools were large—some larger than football fields— some featuring sandy beaches and pool decks where sun-bathing became a favorite American past-time.

The Decline of Municipal Pools

Racial integration and the booming post-war economy are reasons Wiltse gives for another major step in American swimming pool evolution: the proliferation of private swim clubs and backyard pools. Wiltse laments the decline of the American municipal pool.

Although municipal pools may not be as commonplace as they once were, the swimming pool, whether public or private, indoor or outdoor, remains a treasured venue for exercise, recreation and relief. The technology that has evolved to operate safe, healthful swimming pools is also used today to reliably maintain water parks, spas and hydrotherapy pools, all of which enrich our lives and health.

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Pool/Spa Management Formulas

FORMULAS FOR POOL CAPACITY

L = length W = width V = volume D = depth

r = radius (half of the diameter of a circle)

π = (pi) 3.14 (a factor used in calculations with circles)

AVERAGE DEPTH

For constant slope: $[D (\text{min}) + D (\text{max})] \div 2 = \text{AVERAGE DEPTH}$

Note: For multi-depth pools calculate the volume in sections of constant slope and add them together.

CUBIC FEET OF VOLUME (surface area \times average depth)

Rectangular pool $V = L \times W \times D^{\text{Ave}}$

Circular pool $V = r^2 \times \pi \times D^{\text{Ave}}$

$$\begin{array}{ccccccc} \text{Length} & & \text{Width} & & \text{Average Depth} & & \text{Volume} \\ L \text{ ft} & \times & W \text{ ft} & \times & \left[\left(\begin{array}{c} \text{Shallow Depth} \\ D_{\text{min}} \text{ ft} \end{array} + \begin{array}{c} \text{Deep Depth} \\ D_{\text{max}} \text{ ft} \end{array} \right) \div 2 \right] & = & V \text{ ft}^3 \end{array}$$

CONVERTING TO 'GALLONS' FROM 'CUBIC FEET' (cubic foot (ft³) of water = 7.48 gallons)

$$\frac{X \text{ ft}^3}{1} \times \frac{7.48 \text{ gallons}}{1 \text{ ft}^3} = Y \text{ gallons}$$

$$\frac{3000 \text{ ft}^3}{1} \times \frac{7.48 \text{ gallons}}{1 \text{ ft}^3} = 22,440 \text{ gallons}$$

FLOW RATE/TURNOVER RATES

SPAS: Required turnover every 30 minutes therefore required flow rate is:

Gallons \div 30 minutes = minimum (min) flow rate in gallons per minute (gpm)

SMALL LIMITED USE POOLS: Required turnover at least every 8 hours (8 \times 60 min = 480 min)

Gallons \div 480 minutes = min flow rate in gpm

GENERAL USE, LIMITED USE OVER 2000 SQ FT SURFACE AREA AND ATHLETIC CLUB POOLS: Required turnover at least every 6 hours (6 \times 60 min = 360 min)

Gallons \div 360 minutes = min flow rate in gpm

Water Quality Monitoring and Recording Recommended Frequencies

The Codes Say:

Pool Water Quality 333-060-0200:

(3) Pool operators shall test and record the parameters described in paragraph (2)(a) and (2)(b) of this section with the following minimum frequencies during periods when the pool is open for use:

- (a) pH - daily
- (b) Chlorine
 - (A) Outdoor Pools:
 - Chlorine (Non-stabilized) - hourly
 - Chlorine (Stabilized with a minimum of 30 ppm cyanuric acid) - every 4 hours
 - (B) Indoor Pools: - Chlorine - every 4 hours
- (c) Bromine
 - (A) Outdoor Pools: - Bromine - hourly
 - (B) Indoor Pools: - Bromine - every 4 hours
- (d) Continuous reading devices shall satisfy requirements (3)(a) and (b), and (c) if such devices record in pH units and ppm of free chlorine or bromine...
- (g) Total alkalinity - weekly
- (h) Calcium hardness - (recommended) - weekly
- (i) Turbidity - daily
- (j) Cyanuric acid (if used) - monthly.

Spa Water Quality 333-62-165:

(3) Pool operators shall test and record the parameters described in section (1) of this rule with the following minimum frequencies during periods when the pool is open for use:

- (a) pH -- every 2 hours;
- (b) Chlorine (Non-stabilized) -- hourly; chlorine (stabilized) -- every 2 hours; continuous reading devices shall satisfy requirements of subsections (3)(a) and (b) of this rule if such devices record in pH units and ppm of free chlorine;
- (c) Bromine -- hourly; continuous reading devices shall record in units of ppm bromine;
- (d) Total alkalinity -- daily...
- (g) Turbidity -- daily;
- (h) Cyanuric acid -- weekly (when using stabilized chlorine);
- (i) Calcium hardness -- weekly (recommended)

Hood River County Health Department Recommends:

	Outdoor* Pool	Indoor† Pool	Outdoor* Spa	Indoor† Spa
Chlorine^ψ / Bromine	Hourly	Every 4 hours	Hourly	Every 2 hours
pH	Daily		Every 2 hours	
Alkalinity	Weekly		Daily	
Temperature	Weekly		Daily	
Calcium Hardness	Weekly			
Cyanuric Acid	Weekly			

ψ Also check 'Combined-Chlorine' at this time

*Non-Stabilized Outdoor Pool/Spa with Chlorine Disinfection

† May include outdoor Pool/Spa with Stabilized Chlorine (Cyanuric Acid) or Bromine

Spa

Public Spas Weekly Record Sheet

Hood River County Health Department
(541) 387-6885

Date: day / month / year First Day of Week:	Name of Spa: Hours of Operation:	24 Hour Emergency Contact: Name: _____ Phone: _____
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Start of week pre-opening measurements performed at:

Free Chlorine: FC:	Combined Chlorine CC:	Potential of Hydrogen: pH:	Carbonate Alkalinity: Alk:	Calcium Hardness: CH:	Cyanuric Acid Cy:	Temperature: °F:	F.T.U.: Clarity:
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Notes:

Water Balance Calculation (calculate langelier index or use the Taylor® Watergram, Water Balance Calculator in your test kit):
 (pH) _____ + (TF) _____ + (CF) _____ + (AF) _____ - 12.1 = _____
Values between = +0.5 & -0.5 are balanced. If < -0.5, pool is corrosive. If > +0.5, pool is scaling.

Temperature °F = TF		Calcium Hardness ppm = CF		Total Alkalinity ppm = AF	
32	0	5	0.3	5	0.7
37	0.1	25	1.0	25	1.4
46	0.2	50	1.3	50	1.7
53	0.3	75	1.5	75	1.9
60	0.4	100	1.6	100	2.0
66	0.5	150	1.8	150	2.2
76	0.6	200	1.9	200	2.3
84	0.7	300	2.1	300	2.5
94	0.8	400	2.2	400	2.6
105	0.9	800	2.5	800	2.9
Too	Hot	1000	2.6	1000	3.0

Corrective Actions, Dosing, etc:

This pool has been verified as 'ready to open' at start of the week by: (signature) _____

Daily Pre-opening:				pH Measurements: – At least every 2 hours of operation.												
pH	Alk	Clarity	Temp	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	11 th	12 th	
				Mon.												
				Tues.												
				Wed.												
				Thur.												
				Fri.												
				Sat.												
				Sun.												

Daily Pre-Opening: FC & CC		Write in times --		Chlorine Measurements: – At least every 2 hours of operation (hourly if outdoor spa using non-stabilized chlorine)																							
				FC	CC	FC	CC	FC	CC	FC	CC	FC	CC	FC	CC	FC	CC	FC	CC	FC	CC	FC	CC	FC	CC		
FC	CC	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	11 th	12 th														
		Mon.																									
		Tues.																									
		Wed.																									
		Thur.																									
		Fri.																									
		Sat.																									
		Sun.																									

Record All Corrective Action(s) (if more space is needed, use the back of this form):

Emergency & Operations Action Plan

Work Sheet

For Limited-Use Pools & Spas

Pool/Spa Name:	24 hr. Emergency Contact Phone (manager):			
Manager (if different from Licensee):	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;">Cell:</td> <td style="width: 33%; border: none;">Home:</td> <td style="width: 33%; border: none;">Other:</td> </tr> </table>	Cell:	Home:	Other:
Cell:	Home:	Other:		
	Licensee (owner):			

Pool/Spa hours of operation: _____

Important Phone Numbers: For Emergencies Dial: '911'

Local Police Department: 911 or 541-386-2711	Local Fire Department: 911 or 541-386-2711	Local Ambulance: 911 or 541-386-2711	Local Health Department: 541-387-1115 541-387-6885	Local Electricity Utility:
Pool Chemical & Equipment Supplier:	Local Water Utility:	Local Gas Utility:	Other Utility:	Poison Control Hotline: 1-800-222-1222

Communication:

A media spokesperson should be designated to handle media inquires, and inevitable result of a major aquatic emergency. Generally, the media spokesperson is a management-level employee with specific training in how to properly respond to media inquires while minimizing legal exposure.

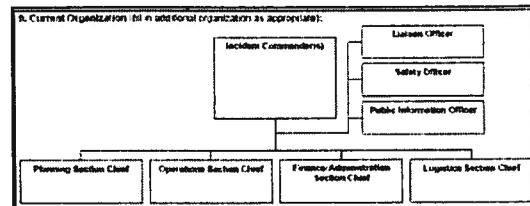
What is your policy regarding communication with the media during an emergency?

Who is responsible for interviewing witnesses and recording the event(s) in the accident log?

Who is responsible for contacting the local Health Department to report the event(s)?

Health & Accident Emergencies:

Some examples of health emergencies include: (1) Drowning; (2) Heart attacks & Strokes; (3) Falls; (4) Spinal cord injuries; (5) Seizures; (6) Cuts, Abrasions, & Broken limbs; and (7) Head Injuries; (8) Chemical Exposure, (9) Disease Outbreaks & (10) Criminal Acts.



Who is 'in-charge' during an emergency? Who is the substitute? _____

Who calls 911 during an emergency? Who is the substitute? _____

Who is responsible for retrieving the **First Aid Kit**? _____

Who is responsible for waiting for EMS and directing them to the scene? _____

Who is responsible for controlling crowds? _____

Steps to Follow During a Drowning Emergency:

Steps to follow During a Health Emergency (heart attack for example):

Steps to follow during a head, spinal or other injury emergency:

Safety:

Oregon Code mandates the following safety rules in pools & spas:

<p>Pool:</p> <p>For Swimmers OAR 333-060-0210(3):</p> <ol style="list-style-type: none">1. No person shall swim alone;2. Non-swimmers and children under 14 years of age shall not use the pool unless a lifeguard is present or, in a limited-use pool, a responsible adult observer is present;3. Bathers shall take a cleansing shower before entering a general-use pool;4. No person suffering from a communicable disease transmissible via water or under the influence of an intoxicating liquor or drug shall use the pool;5. No person shall take food or drink inside the pool enclosure except in areas specifically designated for such use as described in Food Services;6. No person shall bring, throw or carry food, drink, smoking material, trash, debris, or any other foreign substances into the pool;7. No person shall run or engage in horseplay in or around a public swimming pool;8. Persons in street shoes shall not be permitted on the pool deck areas used by bathers. <p>For Operators:</p> <ol style="list-style-type: none">1. Gates and doors in swimming pool enclosures shall be self-closing and shall be equipped with a lockable self-latching device... 333-060-0105(2)(f)2. At limited-use public pools only... operators or managers shall maintain surveillance over the pool during operating hours. Such surveillance shall be no less frequent than the frequency of manual pool water testing... 333-060-0210(2)(b)	<p>Spa:</p> <p>For Bathers ((333-62-175(3)):</p> <ol style="list-style-type: none">1. Non-swimmers and children under 14 years of age shall not use the spa pool unless a lifeguard or responsible adult observer is present;2. Bathers shall take a cleansing shower;3. No person suffering from a communicable disease transmissible via water or under the influence of an intoxicating liquor or drug shall use the pool;4. No person shall take food or drink inside the pool enclosure except in areas specifically designated for such use as described in OAR 333-62-155;5. No person shall bring, throw or carry food, drink, smoking material, trash, debris, or any other foreign substances into the pool;6. No person shall run or engage in horseplay in or around a public spa pool;7. Persons in street shoes shall not be permitted on the pool deck areas used by the bathers <p>For Operators:</p> <ol style="list-style-type: none">1. Public spa pools shall be protected by an enclosure. Such enclosure shall be a fence, wall, or building without private entrances to the pool area (333-62-080(1).2. Operators or managers shall make visual observation of the spa pool during operating hours. Such visual observation shall be at least once every two hours (333-62-175(2).
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What steps do you take throughout the day to ensure that safety rules are being enforced?

What are your policies regarding surveillance of the pool/spa area?

What special challenges for safety exist in your facility?

Communicable Disease Outbreak:

1. If you are contacted by persons who are ill or who have questions, how would you answer their questions and complaints? To whom would you refer these individuals? How would you manage press inquiries in the event of an outbreak?

The following table is an example of a fecal accident policy plan for a limited use pool/spa:

Actions for well-formed stools & vomit:	Actions for liquid accidents like diarrhea or liquid vomit: <i>- Non-Cryptosporidium Accident -</i>
<ol style="list-style-type: none">1. Clear the pool.2. Close the pool for at least one hour.3. Check for adequate disinfectant in the area.4. Remove as much of the material as possible using a net or scoop. Vacuuming is not recommended unless it discharges to waste. (If the material is sent back to the filter, we may only be spreading the problem.)5. Add additional disinfectant as necessary.6. Reopen Pool.	<ol style="list-style-type: none">1. Clear the pool.2. Close the pool for at least one hour.3. Add chlorine to raise the pool to 5 ppm, or equivalent using other disinfectants.4. Remove any chunks or pieces.5. Allow some time for the disinfectant to spread and work on the extra organic material. In addition we need to avoid "hot" spots of disinfectant that swimmers may swim through.6. Recheck for adequate chlorine.7. Allow at least one complete water filtration cycle (time for all of your water to pass through your filter).8. Reopen pool.

Who is in charge of implementing the fecal accident policy plan? Are they available during all pool-operating hours?

Additional Notes:

Monitoring Water Quality:

In order to have properly balanced and sanitized water, it is necessary to test for different chemical factors or parameters to verify that proper ranges are maintained. Appropriate test procedures must be followed in order to obtain accurate results.

Who is responsible for monitoring water quality in your facility during all hours of operation?

Swimming Pool Water Quality Criteria:

Parameters	Min.	Ideal	Max.
Free chlorine For outdoor pools using non-stabilized Cl test every hour For outdoor pools using Stabilized Cl (with at least 30 ppm of Cyanuric acid) test every 4 hours For indoor pools test every 4 hours	0.8 ppm	1.0 - 3.0 ppm	5.0 ppm
Combined chlorine Test daily	-	0	0.5 ppm
Bromine Outdoor pools test hourly Indoor pools test every 4 hours	3.0 ppm	3.0 - 5.0 ppm	8.0 ppm
pH Test Daily	7.2	7.4 - 7.6	7.6
Total alkalinity (CaCO ₃) Test Weekly	80 ppm	100 - 125 ppm	200 ppm
Calcium hardness Test Weekly (Recommended)	175 ppm (Recommended)	-	300 ppm (Recommended)
Cyanuric acid (Stabilized Chlorine – For outdoor use only!) If used, test weekly	0 ppm	30 ppm	150 ppm

Spa Water Quality Criteria:

Parameters	Min.	Ideal	Max.
Free chlorine For outdoor spas using non-stabilized Chlorine: Test every hour All other spas: Test every 2 hours	1.5 ppm	3 ppm	5.0 ppm
Combined chlorine Test daily	-	0	0.5 ppm
Bromine Test every hr	3.0 ppm	3.0-5.0 ppm	8.0 ppm
pH Test every 2 hrs	7.2	7.4 - 7.6	7.6
Total alkalinity (CaCO₃) Test Daily	80 ppm	80-125 ppm <i>(for plaster & tile spas)</i> 125 - 150 ppm <i>(for vinyl, painted, or fiberglass finishes)</i>	180 ppm (Recommended)
Calcium hardness Test weekly (recommended)	175 ppm (Recommended)	-	300 ppm (Recommended)
Cyanuric acid <i>(Stabilized Chlorine – For outdoor use only!)</i> If used, test weekly	0 ppm	30 ppm	150 ppm
Water temperature Test often enough to maintain	-	-	104 ° F

Forms developed by Hood River County Health Department for recording water quality are available online at:

Hood River County Web-Page: <http://www.co.hood-river.or.us/>

Click the following links:

'Health Department' → 'Environmental Health' → 'Food, Pools and Lodging Facility Health & Safety' → 'Pool & Spa Licensing' → see documents at the bottom of the page.

Or: http://www.co.hood-river.or.us/index.asp?Type=B_BASIC&SEC={B5BA82AC-C31A-4484-88A7-AD84B2E9BE58}

The purpose of performing this calculation is to protect your pool equipment from the damaging effects of scaling or corrosive water. The Langelier index is one of several methods of calculating calcium saturation in your pool. This index is the one that the Hood River County Environmental Health Department will most often use. All the indexes use the pH, total alkalinity, calcium hardness, temperature and total dissolved solid levels in your pool. The relation of these allows us to determine the calcium saturation.

The calculation uses the pH of the water as is, and adds factors off the table below for total alkalinity, calcium hardness and temperature. Total dissolved solids do not change the calculation much, and are often used as a constant of (-12.1). If the TDS is over 1000 ppm the constant can be changed to (-12.2). The formula for calculating the calcium saturations is:

$$\text{Saturation Index} = \text{pH} + \text{TF} + \text{CF} + \text{AF} - 12.1$$

Temperature °F = TF	Calcium Hardness ppm = CF	Total Alkalinity ppm = AF
32	0	0.7
37	0.1	1.4
46	0.2	1.7
53	0.3	1.9
60	0.4	2.0
66	0.5	2.2
76	0.6	2.3
84	0.7	2.5
94	0.8	2.6
105	0.9	2.9
Too Hot!	1000	3.0

Values between +0.5 and (-0.5) are considered balanced

Negative values are corrosive
 Positive values are scale forming

The following is an example of a calculation done on a ‘limited-use’ pool:

pH = 7.2; Temperature = 80°F; Calcium Hardness = 100ppm; Total Alkalinity = 80ppm

$$\text{Saturation Index} = (\text{pH}) \mathbf{7.2} + (\text{TF}) \mathbf{0.65} + (\text{CF}) \mathbf{1.6} + (\text{AF}) \mathbf{1.9} - 12.1 = \mathbf{(-0.75)}$$

This pool is corrosive; the equipment will be damaged. Since the pH, the Total Alkalinity, and the Calcium Hardness are low, you could use Sodium Bicarbonate to raise Total Alkalinity, and/or you could use Soda Ash to raise the level of the pH, and/or you could add calcium chloride dehydrate to raise the Calcium Hardness.

Who is the person responsible for monitoring calcium saturation in your facility? When is it done?

Recommended Further Reading:

1. Oregon State Statute: ORS: 448.005 – 448.090. <http://www.leg.state.or.us/ors/448.html>
2. Oregon Spa Rules. OAR: 333-060-0000. <http://public.health.oregon.gov/HealthyEnvironments/Recreation/PoolLodging/Documents/sparules.pdf>
3. Oregon Pool Rules. OAR: 333-061-0000. <http://public.health.oregon.gov/HealthyEnvironments/Recreation/PoolLodging/Documents/poolrules.pdf>
4. Oregon Public Health Authority, Public Pool and Tourist Facility Program. 2008 Pool Operator <http://public.health.oregon.gov/HealthyEnvironments/Recreation/PoolLodging/Documents/pooltrainingbook09.pdf>
5. Oregon Public Health Authority, Public Pool and Tourist Facility Program. <http://public.health.oregon.gov/PHD/OEPH/FPLHSS/POOLSLODGING/Pages/index.aspx>
6. Taylor Technologies, Inc. Pool & Spa Water Chemistry: A testing & treatment guide. 2009.
7. Center For Disease Control (CDC) – Healthy Swimming Website: http://www.cdc.gov/healthyswimming/fact_sheets.htm
8. Griffiths, T. 2003. The Complete Swimming Pool Reference: 2nd edition. Sagamore Publishing, Champaign, IL.
9. Hood River County Health Department, Spa/Pool web-site: http://www.co.hood-river.or.us/index.asp?Type=B_BASIC&SEC={B5BA82AC-C31A-4484-88A7-AD84B2E9BE58}

The screenshot shows the Hood River County Oregon website. The header features the county name in a stylized font. A navigation bar includes 'Welcome', 'Events', 'Helpful Links', 'Adopt a Dog', and 'Windmaster Sewer District'. A search bar is located on the right. A left sidebar lists various county departments and services. The main content area is titled 'Pool & Spa Licensing:' and contains text about inspections and re-checks. A photograph of a swimming pool is shown on the right. Below the main text, there is a section for 'New ADA (Americans with Disabilities Act) rules. ADA web-site' with a list of links to various resources.

Hood River County
OREGON

SEARCH

Welcome | Events | Helpful Links | Adopt a Dog | Windmaster Sewer District

Pool & Spa Licensing:

Pool/Spa facilities receive two semi-annual complete inspections each calendar year (excluding seasonal facilities). When a Pool/Spa is closed for significant violations, they must remain closed for 24 hours and until they have passed a pre-opening re-check inspection. After the Pool/Spa is re-opened another re-check inspection will occur at any time to verify that the operator maintains conditions in compliance with rule.

If a facility requires more than two re-check inspections during a license year they are subject to additional inspection fees.

New ADA (Americans with Disabilities Act) rules. ADA web-site

- ◆ Oregon State Pool Rules - OAR 333-060
- ◆ Oregon State Spa Rules - OAR 333-062
- ◆ Oregon State Health Authority - Public Pool and Tourist Facilities Program
- ◆ Oregon Health Authority - Public Pool & Spa Training Opportunities
- ◆ CDC Healthy Swimming/Recreational Water Web-Site
- ◆ Limited Use Public Swimming Pool Weekly Water Quality Parameters Monitoring Sheet
- ◆ Limited Use Public Spa Pool Weekly Water Quality Parameters Monitoring Sheet
- ◆ Slides from the 3-15-12 Pool Operators Training Course - By Ian Stromquist, REHS * This is a fairly large file
- ◆ Hyperchlorination to kill Cryptosporidium Cryptosporidium (or 'Crypto') is a chlorine resistant parasite, so even well-maintained pools, water parks, and interactive fountains can spread Crypto among swimmers
- ◆ Emergency & Operations Action Plan Work Sheet For Limited-Use Pools & Spas
- ◆ ADA - Swimming Pool Compliance Guide Promotional Material from SR Smith