ILLINOIS DEPARTMENT OF PUBLIC HEALTH

ILLINOIS SWIMMING POOL OPERATOR CERTIFICATION COURSE MANUAL

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INTRODUCTION

Under the authority of the Illinois Swimming Pool and Bathing Beach Act [210 ILCS 125/et seq.], the Illinois Department of Public Health is responsible for issuing construction permits, inspecting, and issuing annual licenses for all swimming pools in Illinois except those at private residences intended only for the use of the owner and their guests. Over 3,200 swimming pools are annually inspected and licensed by the Department and its agents . The Department has extensive regulations regarding the construction and operation of these swimming pools in order to provide a safe swimming environment. These regulations are contained in the Swimming Pool and Bathing Beach Code (77 Illinois Administrative Code 820). A copy of this code may be obtained from the Department's web site at www.idph.state.il.us under administrative rules, environmental programs or by calling (217) 782-5830.

The operation of a swimming pool is a complex task that requires knowledge of topics such as chemistry, plumbing, and electricity. It is important to have trained, competent individuals operating the swimming pool. At this time, there is no state requirement for pool operators to be licensed. However, the Department developed this voluntary certification program and learning course to introduce the basic concepts and techniques necessary for the proper operation and maintenance of swimming pools. Many employers and insurance companies are mandating this certification.

All individuals associated with the operation of swimming pools are strongly encouraged to take this course and become certified. Only through proper education, understanding, and implementation of the regulations can the safety of swimmers be assured.

INSTRUCTIONS FOR THE SWIMMING POOL OPERATORS CERTIFICATION

This booklet is a self-teaching course of instruction. It has the advantage of allowing the students to study and learn at their own pace in the privacy of their own homes.

It is the student's responsibility to follow the course instructions. This booklet is divided into nine sections with a quiz following each section. After studying a section, answer each section quiz question on a separate piece of paper. The answers to each section quiz are in the back of this booklet. If any of the quiz questions were answered incorrectly, study that section again until those questions are answered correctly.

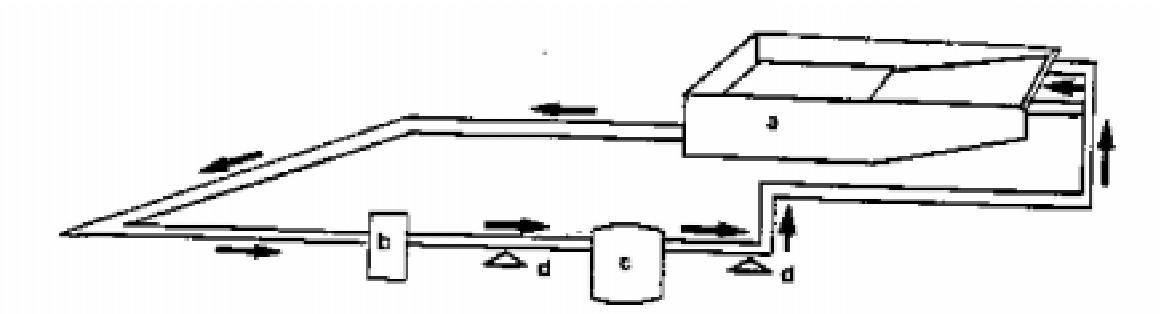
After the student has completed this booklet, arrangements may be made to take the final exam by contacting any of the Department's regional offices indicated on the left side of Attachment 1 in the back of this booklet. The exam is based on information contained in this document and the Swimming Pool and Bathing Beach Code. Copies of these regulations may be obtained from any of the regional offices. A score of 75% is required to be awarded a certificate as a Certified Swimming Pool Operator by the Illinois Department of Public Health.

There is no charge for the exam and it may be retaken until a passing grade is obtained. In addition to this certification booklet, the Department's regional offices provide a training program for pool operators each year to discuss current issues. The licensee of each licensed swimming pool receives notification of these training programs. If you do not receive this notification, the dates and locations of these training programs may be obtained by calling the regional office in the Spring.

SECTION I

BASIC SWIMMING POOL OPERATION

A swimming pool is an artificial basin of water which is designed for public recreational swimming. All pools have four basic units: a) basin, b) pump, c) filter, and d) chemical feeder.



A swimming pool should have good water quality and be free of bacteria and particulate matter. The bacteria in the water are chemically killed by bactericides. The most common bactericide used in swimming pools is chlorine. Particulate and suspended pieces of matter are removed by pumping the water through a filter. The pool water must be pumped through filters and treated with bactericides 24 hours a day to ensure good water quality.

Maintaining water quality is not the only factor in providing a safe swimming environment. Good sanitation of the bathhouse and surrounding pool area is essential for the maintenance of water quality. Bathhouse floors should be disinfected daily. Restroom facilities must be kept clean, free of dirt, debris, and in good repair. Floors must be free from standing water and cleaned with strong cleaners to maintain a sanitary non-slip finish. Pool decks should be rinsed daily. Mats and raised wood walkways should not be used.

Patron regulations regarding bather conduct and admission should be prominently posted. Patron regulations contained in the Swimming Pool and Bathing Beach Code are reprinted as Attachment 2. All footwear, baby strollers, and wheelchairs in the pool area or bathhouse must be clean. No food, drink, gum, or tobacco is allowed in other than specially designated and controlled sections of the pool area. Glass containers are prohibited. All persons are encouraged to take a shower before entering the pool area.

The pool bottom should be kept free from visible dirt and sediment. This can be done by brushing sediments to the main drain or by use of suction cleaners. Long handled, weighted brushes can be used to brush the pool bottom daily and direct the sediment into the pool bottom outlet. Larger pools should use a pool vacuum. Pool vacuuming should only be done when the pool is closed. There are many types of suction cleaners by various manufacturers.

The pool water surface should also be kept free of dirt and windblown matter. To clean the surface of pools with an overflow gutter, the water level should be kept such that a continuous overflow of water occurs. For pools with skimmers, the water level should be kept at the midpoint of the skimmer opening so that the water continuously flows over the floating weir.

Daily tasks should include the following:

1. Check the operation of the recirculation pump and motor.

2. Check the operation of the disinfectant and pH chemical feeder.

3. Measure and record the chlorine or bromine residual and the pH at least twice a day (hourly during periods of heavy use) in both the shallow and deep ends.

4. Check the filter operation, read the pressure gauges, and backwash, if necessary. For all closed filters, manually release the air.

5. Measure and record the flow rate and maintain the flowmeter in a clean, readable operating condition.

6. If necessary, clean the bottom of the pool and manually skim debris from the surface.

7. If necessary, add make-up water to maintain continuous overflow or an adequate water level on the skimmer.

8. Clean and disinfect the bathhouse floors and fixtures; fill soap dispensers, toilet paper holders and paper towel dispensers.

9. Wash the deck with a hose and disinfect the deck at indoor pools at least weekly.

10. Make appropriate entries on the Daily Swimming Pool Operation Report.

Approximately every two weeks, conduct an inventory of all chemicals and supplies, check the recirculation pump efficiency by referring to the pump curve and gauges, and check and replace any needed or outdated medical supplies in the first-aid kit. Contents of the first-aid kit are listed in Attachment 3.

Special Procedures. Fecal accidents or vomiting in the pool requires specific procedures to reduce the likelihood of disease transmission. These procedures are in Attachment 4.

QUIZ FOR SECTION I

1. List four basic units of a swimming pool. A. _____ B.
   C. _____ D.

2. How many hours a day must the pool water be pumped through the filters and treated with bactericides?

3. Spectators in clean footwear are allowed on the pool deck. T F

4. No food, drink, gum, or tobacco is permitted in the swimming pool. T F

5. On pools with skimmers, the water level should be maintained at the _____ of the skimmer.

6. The chlorine or bromine residual and the pH should be measured and recorded at least twice a day. T F

7. For all closed filters, air must be removed daily from each tank by a manual release valve. T F

8. Bathhouse floors should be disinfected every two weeks. T F

9. Pool decks should be rinsed daily. T F

10. Vacuuming the pool keeps the bottom free from visible dirt and sediment. T F

SECTION II

RECIRCULATION

The process of pumping water from the pool through the filter system and returning it to the pool is called recirculation. Typical components of the recirculation system include the piping, pump, valves, inlets, outlets, surge tank, pressure gauges, and flowmeter. The source of the power used to recirculate the water through the system is the recirculation pump. Typically, a centrifugal pump is used to recirculate the pool water.

Inlets are fittings through which filtered water enters the pool. It is important to direct the inlets to produce a uniform recirculation pattern. Dead spots are found in many corners, on stairs or ledges, and in the deep end.

Outlets are devices through which water exits the pool to the filtration system. Types of outlets include the main drain, skimmers, and perimeter overflow system or gutters. It is very important to ensure that grates are securely maintained over outlet drains and other suction outlets to prevent bather entrapment.

A surge tank or balance tank must be used on pools with perimeter overflow systems. The water displaced by a large number of swimmers entering the pool at one time is called surge water. The surge water may be collected in a vacuum filter tank, the perimeter overflow system, the pool or a surge tank where it may then enter the filtration system and return to the pool.

The rate of flow of water that passes through a pump is dependent on the resistance of the water flow due to bends and curves in the pipes and debris in the filter. This resistance or pressure is measured in "feet of head".

A flowmeter is required in each pool recirculation system. The flowmeter measures the quantity of water passing a given point in a unit of time. (i.e., gallons/minute) The flowmeter is required to be installed on a straight length of pipe with no valves, elbows, or other sources of turbulence within 10 pipe diameters upstream and 5 pipe diameters downstream from the flowmeter.

A "turnover" occurs when the amount of water equal to the volume of the pool is pumped through the filtration system. The number of turnovers that occur in a pool can be calculated by using the following equation:

Turnover = Volume of Pool (gallons) / flow rate (gal/min)

EXAMPLE: Pool Volume = 50,000 gallons
Flow Rate = 139 gal/min

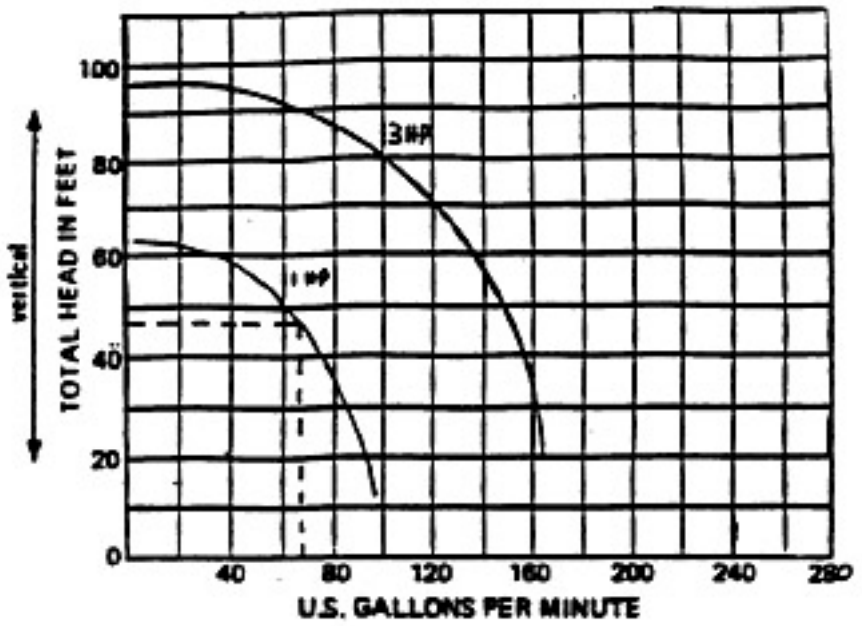
Turnover = 50,000/139 = 360 minutes

360 minutes/60 minutes per hour = 6 hours

The State of Illinois requires the following turnover rates:

Type of Pool	Turnover Rate	Turnovers/Day
Diving Pools	8 hours or less	3 or more
Wading Pools, Wading Areas, Plunge Pools, Plunge Areas, and Lazy Rivers	2 hours or less	12 or more
All Other Pools	6 hours or less	4 or more

A "pump curve" is used to check the accuracy of the pool's flow meter. The pump manufacturer provides a pump curve which is required to be available at the swimming pool. Each pool is required to have a vacuum gauge on the suction side of the pump and a pressure gauge on the discharge side of the pump before any valves.



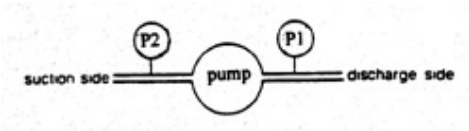
In most swimming pool systems, the suction side of the pump has either a vacuum gauge, which reads in "inches of Mercury (Hg)", or a compound gauge which reads in both "inches of Mercury" and "pounds per square inch (psi)". The discharge side of the pump usually has a pressure gauge reading in psi.

In order to use the pump curve, the gauge readings must be converted into "feet of head". 1 psi = 2.31 feet of head; 1 inch Hg = 1.13 feet of head.
The following equation can be used to determine the "Total Head" to be used with the pump curve:

$$P3 = P1 - P2$$

P1 = the pressure on the discharge side of the pump (feet of head)
P2 = the pressure on the suction side of the pump (feet of head)
P3 = Total Head

EXAMPLE: Determine the flow rate for the 1 Hp pump.



P1 = 20 psi
P2 = 2" Hg

P1 = 20 X 2.31 = 46.2 feet of head
P2 = -2 X 1.13 = -2.3 feet of head
(NOTE: P2 is negative because inches of Hg is a measurement of vacuum which is negative pressure.)

46.2 - (-2.3) = 48.5 feet of Total Head.

Plot this on the pump curve shown. Find the feet of head on the vertical axis of the graph and then draw a straight line to the curve. By following that point down to the horizontal axis, the flow rate is approximately 68 gallons per minute.

QUIZ FOR SECTION II

1. _____ is the process of pumping water from the pool through the filter system and returning it to back to the pool.

2. A _____ pump is commonly used to recirculate the pool water.

3. The resistance or pressure of the water flow due to bends and curves in the pipes and debris in the filter is measured in _____.

4. A _____ measures the rate of flow of the water passing through the recirculation system.
5. Calculate the turnover (in hours) for the following pool:

   Pool Volume = 42,000 gallons
   Flow Rate = 150 gallons/minute (gpm)

   Turnover = _____ Hours

6. Does the turnover rate for the pool in question #5 meet the State requirements for a wading pool? Y N

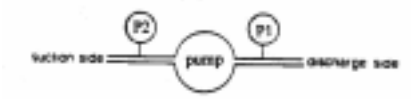
7. One pound per square inch (psi) is equal to _____ feet of head.

8. How many feet of head is equal to 1 inch Hg?

9. Use the pump curve shown to determine the flow rate for the following:

   A. P2 = 2 psi P1 = 27 psi 3 HP pump

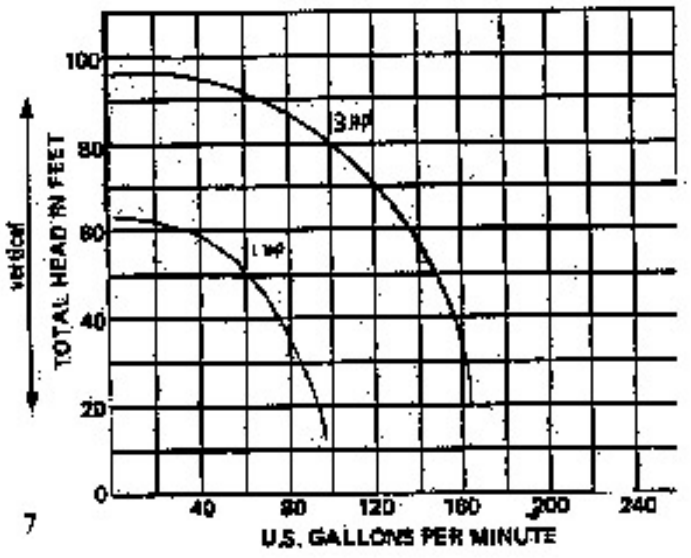
   Flowrate = _____ gallons/minute



   B. P2 = 5" Hg P1 = 20 psi 1 HP pump

   Flowrate = _____ gallons/minute

10. A flowmeter must be installed on a _____ of pipe with no valves, elbows, or other sources of turbulence within 10 pipe diameters _____ and 5 pipe diameters _____ from the flowmeter.



SECTION III

FILTRATION

The filter removes most solid matter from the pool water. There are many types of filters. They utilize sand, fabric, or diatomaceous earth as the filter media. The State of Illinois requires all filters to be certified to comply with Standard 50 by the National Sanitation Foundation (NSF) and be listed as such by an approved certification agency.

The rate of water flow through a filter is called the "filtration rate". It is measured in gallons per minute per square foot of effective filter area (gpm/sq.ft.). The filter manufacturer lists a range of filtration rates for the filter. It is important to not exceed the maximum filtration rate for which a filter was certified. The filtration rate is calculated using the following equation:

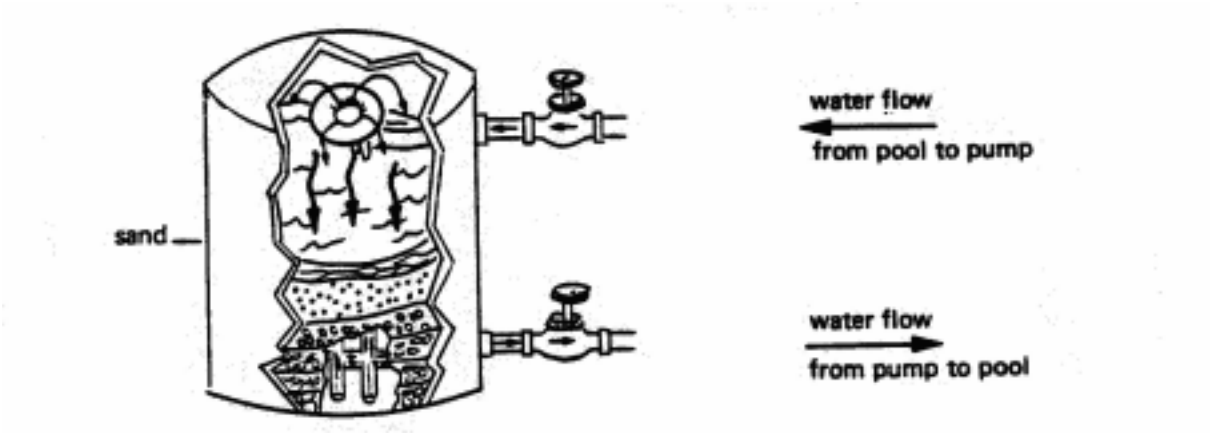
Filtration Rate (gpm/sq.ft.) = Flow Rate(gpm)/Area of Filter(sq.ft.)

The flow rate is obtained from the flow meter.
The area of the filter is obtained from the data plate on the filter.

EXAMPLE: Flow Rate = 75 gpm
Filter Area = 4.9 square feet

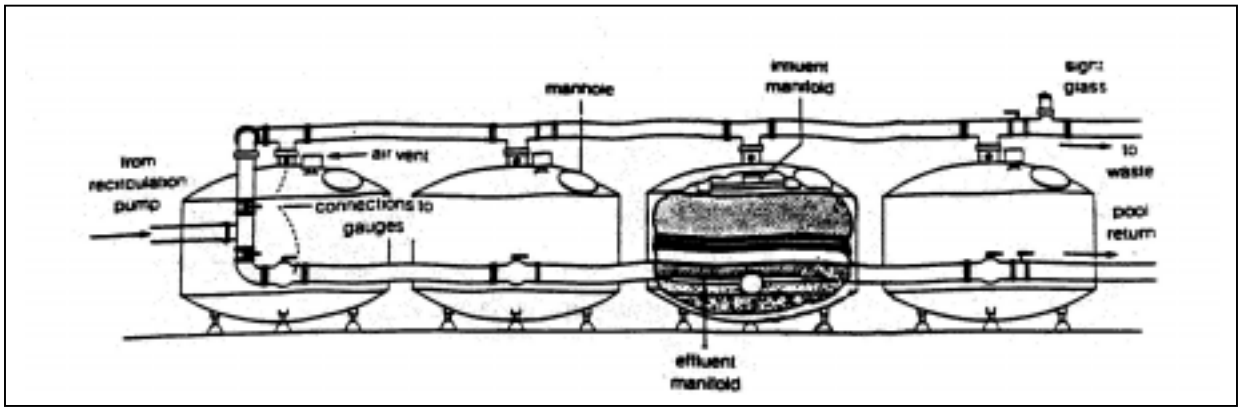
Filtration Rate = 75/4.9 = 15.3 gpm/sq.ft.

One type of filter is the conventional pressure sand filter (CPS). This unit filters water through several layers of various sized gravel and a layer of fine grained sand. A CPS filter can operate at a flow rate of no more than 3 gallons per minute for each square foot of effective filter surface area.



This system operates with the (influent) pool water entering the top of the filter, passing through the sand and gravel layers, and exiting the filter from the bottom of the tank (effluent).

When the difference between the influent and effluent pressure gauges reaches 6 to 8 pounds per square inch (psi), it is an indication the filter needs to be backwashed. Backwashing is the process of cleaning a filter by reversing the flow of water through the filter and draining to waste. A six inch air gap is required between the backwash pipe and the waste pipe to prevent backflow. Backwashing eliminates mud ball formations, calcification of the sand, and accumulation of organic matter that would hinder proper filter operation. Due to the small amounts of dirt that can remain in the piping and in the sand after backwashing, some operators may wish to route the first amount of water that passes through the freshly cleaned filter to waste.



The minimum backwash rate for sand filters is 15 gpm/sq.ft. To backwash a CPS filter, turn off the pump and close the valves both from the filter to the pool and from the pump to the filter. In a multiple filter system (as shown), adjust the other valves so that the water can only be pumped through one filter tank. Turn off the pump and slowly open the backwash valve. When the backwash water appears to be clear through the site glass, the filter is clean. Close both the effluent and influent valves slowly so the sand can settle evenly. Repeat this for each filter tank, then turn on the pump and adjust all the valves for normal operation.

The High Rate Sand Filter (HRS) is similar in appearance to the CPS filter except it is smaller and uses only sand, no gravel. HRS filters are capable of filtration rates up to 20 gpm/sq.ft. Backwashing a HRS filter should be performed when the difference between the influent and effluent pressure gauges reaches 10 to 15 psi. The backwash procedures for the HRS filters are similar to the CPS filter. The backwash rate for HRS filters must be at least 15 gpm/sq.ft. of effective filter area. For all closed filters, air must be removed from each tank daily by a manual air release valve.

A diatomaceous earth (DE) filter uses finely crushed diatoms (tiny aquatic plant fossils) as the filter media. Pressure DE filters use a pump ahead of the filter to push water through the system. Vacuum DE filters have the pump after the filter to pull water through the system. The maximum filtration rate for both types of DE filters is 1.5 gpm/sq.ft. except when continuous feeding (slurry feed) of DE is employed, in which case the maximum filtration rate is 2 gpm/sq. ft.

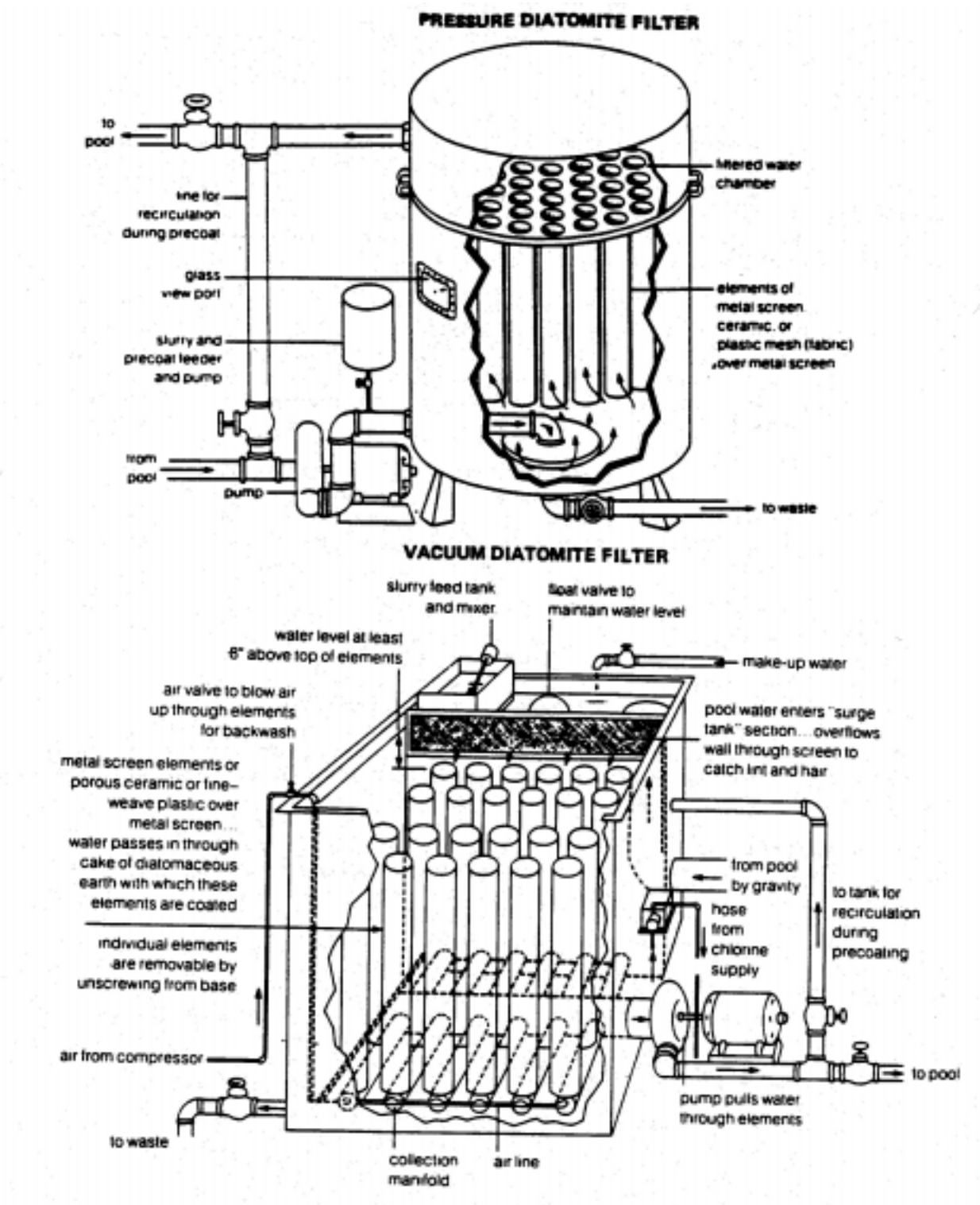
DE filters must be pre-coated with diatomite prior to operation. To pre-coat a DE filter, adjust the valves to isolate the filter from the pool and allow the water to circulate from the filter to the pump and back to the filter. Once the filter is isolated, fill the filter tank or pre-coat pot (a basin that feeds the material mechanically) with clean water and start the recirculation pump. Add 1.5 ounces of diatomite per square foot of filter surface area to the water. As the water containing the diatomite passes over the filter surface, the diatomite adheres evenly to the filter surface establishing a DE pre-coat. During this process, the flow should be directed to recycle through the filter or discharge to waste to avoid introducing the DE to the pool. When all the diatomite added has been coated onto the filter surface, open the valves leading to and from the pool. If the pool water has a milky cloudiness, check the DE filter for a broken or torn filter element.

The manufacturer's instructions will state when cleaning is necessary. Usually, pressure DE filters require cleaning when the pressure differential between the filter's influent and effluent piping is 25 to 30 psi. For vacuum DE filters, this range is 12 to 16 inches of mercury (Hg).

DE filters may be cleaned by one of the following methods:

1. Backwashing (reversing the flow).
2. Air-bump-assist backwashing (momentary reversing surge of water caused by air trapped under pressure in the system).
3. Spray washing (hosing down the filter surface).
4. Agitation (physically cleaning the elements).

When cleaning a DE filter, the pump is turned off in order to release the pressure which holds the DE material to the elements. The valves leading to and from the pool basin are closed. Open the valve leading from the filter to the waste drain. Clean the DE material from the element by one of the methods listed above. The DE material will fall to the bottom of the tank where it can be washed out to waste. After all the DE material is cleaned out, the valves can be adjusted to pre-coat the filter elements.



QUIZ FOR SECTION III

1. The filter removes _____ matter from the pool water.

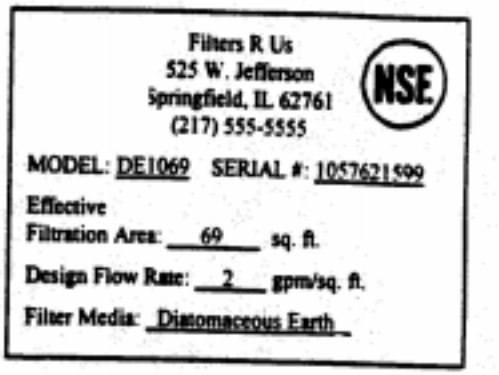
2. Name two different types of Diatomaceous Earth (DE) filters. A. _____ B.

3. The rate of water flow throuth the filter is called the _____ .

4. Determine the filtration rate for the following:

   Flow Rate = 250 gpm
   Filter Area = 69 sq. ft.

   Filtration Rate = _____ gpm/sq. ft.



5. Is the filtration rate in Question 4 in compliance with the manufacturer's design specifications? Y N

6. The process of cleaning the filter by reversing the flow of water through the filter and draining to waste is called _____ .

7. The State of Illinois requires a six inch _____ be provided between the backwash pipe and the waste pipe.

8. A high rate sand filter should be backwashed when the difference between the influent and effluent pressure gauges reaches _____ psi.

9. Tiny aquatic plant fossils are used as the filter media in _____ filters.

10. The maximum filtration rate for both vacuum and pressure (DE) filters is _____ gpm/sq.ft. except when continuous feeding of (DE) is employed, in which case the maximum filtration rate is _____ gpm/sq. ft.

11. (DE) filters must be _____ prior to operation.

12. Pressure (DE) filters should be cleaned when the pressure differential between the influent and effluent gauges is between ____ and ____ psi.

13. Vacuum (DE) filters should be cleaned when the pressure differential between the influent and effluent gauges is between ____ and ____ inches of Hg.

14. The State of Illinois requires high rate sand filters to be backwashed at a rate of 15 gpm/sq.ft. T F

15. The State of Illinois requires all filters to be certified to comply with NSF Standard 50. T F

SECTION IV

CHEMISTRY

The pH is an indication of how acidic or basic (alkaline) the pool water is and is expressed by a number between 0 and 14. The pH is neutral at 7. The water becomes increasingly more acidic at lower values and increasingly more basic at higher values. The pH of pool water must be maintained between 7.2 and 7.6. In this pH range, the chlorine or bromine disinfectant effectively destroys microorganisms, reduces eye irritation, and minimizes damage to the pool and its equipment.

pH	0	7	14
	Acidic	Neutral	Basic

The pH level of the pool water can be changed by adding concentrated acids or bases to the water. To raise the pH, soda ash (sodium carbonate) or sodium hydroxide may be added. To lower the pH, muriatic acid (diluted hydrochloric acid) or sodium bisulfate may be added.

Pools with volumes over 100,000 gallons and all swimming pools utilizing gas chlorine as a disinfectant are required to have a chemical feeder to control and maintain the pH of the water. Positive displacement pumps used to feed chemicals for pH control must be installed such that feeding of chemicals will be stopped when the swimming pool recirculation flow is interrupted. Pools with volumes less than 100,000 gallons may manually add pH control chemicals directly to the pool water when swimmers are not present.

Alkalinity is a measure of the pH buffering capacity in the water. Buffering is the ability to resist changes in pH due to the presence of bicarbonate and carbonate in the water. The alkalinity of pool water must be between 50 and 200 parts per million (ppm) as calcium carbonate. When the water alkalinity level falls below 50 ppm, the pH will fluctuate widely with the addition of small amounts of pH control chemicals. To raise the alkalinity, sodium bicarbonate (baking soda) may be added. 1.5 pounds of sodium bicarbonate added to 10,000 gallons of water will raise the alkalinity 10 ppm. To lower the alkalinity, muriatic acid may be added. 1.6 pints of muriatic acid added to 10,000 gallons of water will lower the alkalinity 10 ppm.

Water hardness is caused by dissolved calcium and magnesium compounds. Excessive water hardness may result in scale formation within the pool recirculation equipment; especially heaters. Pool water lacking sufficient calcium hardness may cause etching of plaster surfaces. Calcium hardness is increased by the addition of calcium chloride. Ten pounds of calcium chloride in 10,000 gallons of water will raise the hardness 80 ppm.

Dissolved metals may impart color to the pool water. Iron is the most common metal found in water. High levels of dissolved iron will cause the water to have a clear green color. Interior pool surfaces may also have red or brown precipitate stains. Superchlorination to 5 to 10 ppm of chlorine will aid in eliminating this effect.
To prevent algae from forming in the pool, maintain an adequate chlorine or bromine residual. Chlorine will kill existing algae as well as prevent its growth. Bromine is less effective at killing existing algae.

The most common disinfectant used to kill bacteria in swimming pools is chlorine. Chlorine is a very strong oxidizer. Chlorine is available as a gas, liquid, or a granular powder or tablet.
Extreme care must be used when handling any form of chlorine as it is very hazardous.

Gas chlorine provides 100% available chlorine and is very toxic. Specialized equipment is necessary to meter the gas into the water. When chlorine gas mixes with water, it forms hydrochloric acid as a by-product, which in turn lowers the pH. Approximately 1.5 pounds of soda ash per pound of gas chlorine used is needed to maintain the proper pH. Only personnel trained in the use of gas chlorine should use this type of equipment. All gas chlorine tanks must be secured to prevent them from falling over. Chlorine tanks must be kept in an air tight room that is equipped with mechanical ventilation capable of providing one air change per minute.
Chlorine tanks being used must be positioned on individual scales to determine the amount of chlorine used per day. Liquid chlorine (sodium hypochlorite) is a clear yellow liquid used for disinfection. Liquid chlorine solutions typically used for pools contain 10% available chlorine. The pH of liquid chlorine is quite high, near 13. A chemical metering pump is used to inject the concentrated liquid into the recirculation system. Liquid chlorine should be stored out of direct sunlight in a cool place. Care must be exercised when handling liquid chlorine to avoid splashing and spills.

Powdered chlorine (calcium hypochlorite) contains 65% available chlorine. Calcium hypochlorite has a pH of 11. In order to feed powdered chlorine, a solution with water is made and injected through a chemical metering pump. The chlorine solution should not exceed 5% available chlorine to minimize fouling of the metering pump. 3.5 pounds of calcium hypochlorite in 5 gallons of water is equivalent to a 5% solution. The white, chalky material which settles out to the bottom of the mixing tank should be removed and disposed of properly.

Granular chlorine (sodium dichloro-isocyanuric acid) is a white, granular compound containing 56% available chlorine. This chlorine product has a chlorine stabilizer contained in the product that minimizes the effects of sunlight. The pH of granular chlorine is 6.8. The granular chlorine may be dissolved in water solution and injected into the pool through a metering pump. A special granular feeder may also be used to feed the product.

Tablet or stick chlorine (trichloro-isocyanuric acid) is widely used in smaller outdoor pools. The tablets are slow dissolving and contain 90% available chlorine. The tablets are acidic with a pH of 3.0. An erosion type feeder is installed in the recirculation equipment to feed chlorine to the pool water. Chlorine tablets may not be placed in the surface skimmers or gutters. The use of trichloro-isocyanuric acid tablets is not recommended at indoor pools as the cyanuric acid is a stabilizing agent that acts against the effects of sunlight on chlorine. High cyanuric acid levels reduce the activity of the chlorine. When the cyanuric acid level exceeds 100 ppm, the pool must be partially drained until the cyanuric acid level is 50 ppm or less.

Bromine tablets and sticks (1-bromo-3-chloro-5, 5-dimethylhydantoin) are used as swimming pool disinfectants. Like chlorine tablets, bromine tablets are slow to dissolve and are fed through an erosion feeder. Bromine tablets provide 61% available bromine and 27% available chlorine. The pH of the compound is approximately 4.0. Bromine is not as strong an oxidizer as chlorine, but is effective over a wider pH range than chlorine.

Bacteria, dirt, and other substances are constantly added to the pool water from swimmers and the environment. The amount of chlorine that must be added at any time to react against these substances is called chlorine demand. If bromine is used as the disinfectant, it is called bromine demand. When the chlorine demand is met, an additional amount of chlorine is added in anticipation of the substances yet to enter the water. This safety factor is called residual chlorine.

When chlorine is added to water, hypochlorous acid and hypochlorite ions are formed. In water with a pH less than 7.5, more hypochlorous acid is formed than hypochlorite ions, which results in a more efficient bacteria kill. Residual chlorine in the form of hypochlorous acid and hypochlorite ions is called free residual chlorine. Residual chlorine that is combined in the water with ammonia compounds is called combined residual chlorine or chloramines. A free chlorine residual from 1.0 ppm to 4.0 ppm must be maintained at all times. If the water temperature exceeds 85°F, a minimum free chlorine residual of 2.0 ppm is required. Bromine must be maintained between 2.0 and 8.0 ppm as total bromine. If the water temperature exceeds 85°F, a minimum total bromine residual of 4.0 ppm must be maintained. Indoor pools are required to maintain a swimming pool water temperature between 76°F and 92°F.

If combined residual chlorine or chloramines should develop, it can be remedied by increasing the chlorine residual to a point where all of the ammonia (with which the chlorine is combined) is oxidized. A level up to 10 ppm will cause a sudden drop in the combined chlorine residual level. Any additional chlorine added at this time will be free chlorine. This process is called breakpoint chlorination (shocking) and should only be done when the pool is closed. Swimming must not be allowed until the free chlorine residual has dropped to between 1.0 and 4.0 ppm or for bromine, between 2.0 and 8.0 ppm. The pool must be superchlorinated or shocked when combined chlorine exceeds 0.5 ppm.

Parts per million (ppm) is calculated by weight. One ppm is equal to 1 pound of chemical in 1 million pounds of water. One million pounds of water is approximately 120,000 gallons. Converting to ounces, (1 pound = 16 ounces) 1 ounce of chemical in 7500 gallons equals 1 ppm.

EXAMPLE: How much calcium hypochlorite (65% available chlorine) must be added to a 10,000 gallon pool to raise the chlorine residual from 0.3 ppm to 1.5 ppm?

10,000 gallons/7500 = 1.33 ounces of chlorine to raise the residual 1 ppm. However, the residual needs to be raised 1.2 ppm (1.5 - 0.3). Therefore, 1.33 ounces x 1.2 ppm = 1.59 ounces of chlorine to raise the residual 1.2 ppm. But, calcium hypochlorite is only 65% available chlorine. Therefore, 1.59 ounces / .65 = 2.44 ounces of calcium hypochlorite (65% available chlorine) is needed to raise the residual from 0.3 ppm to 1.5 ppm.

Combined chlorine may also be oxidized by the use of a non-chlorinated shock product. The non-chlorinated shock product is the chemical peroxymonosulfate. Like chlorine, peroxymonosulfate is an oxidizer that will destroy organic contaminants such as ammonia compounds. Peroxymonosulfate does not disinfect, it simply controls organics and combined chlorine. It will not affect other chemical levels in the pool water.

There are many commercially available pool chemicals for specialized problems such as resistant algae, mineral stains, clarifying and cleaning. The usefulness of these chemicals varies with the type of pool operation and the operator.

It is important to remember these basic safety rules for handling sanitizing products as they are highly reactive and may give off dangerous gases:

1. Always add chemicals to water, **NEVER** add water to chemicals.

2. Keep chemicals in a cool location away from heat and direct sunlight.

3. Keep muriatic acid, rags, paints, oils, etc., far from chlorine products.

4. **NEVER** re-use emptied chlorine pails for refuse or storage of other chemicals.

5. **NEVER** combine different chlorine products.

6. Keep all chemicals and test kits out of the reach of children.

QUIZ FOR SECTION IV

1. The pH of pool water must be maintained between _____ and _____ .

2. Adding _____ or _____ will raise the pH of the water.

3. Adding _____ or _____ will lower the pH of the water.

4. The State of Illinois requires the alkalinity of pool water to be between _____ and _____ ppm.

5. _____ is the most common metal found in water.

6. The most common disinfectant used to kill bacteria in swimming pools is _____ .

7. Chlorine is available in these three forms: A. _____ B. _____ C.

8. Which form of chlorine provides 100% available chlorine?

9. When the chlorine demand is met, the additional amount of chlorine added in anticipation of the substances yet to enter the water is called _____.

10. Free residual chlorine is in the form of hypochlorite ions and _____ .

11. The free chlorine residual must be maintained between _____ and _____ ppm.

12. The free bromine residual must be maintained between _____ and _____ ppm.

13. The process of increasing the chlorine residual to a point where all of the ammonia combined with chlorine is oxidized is called _____ chlorination.

14. Chlorine tablets may be placed in surface skimmers or scum gutters. T F

15. Indoor pools must maintain a temperature between _____ and _____ degrees F.

16. A 40,000 gallon pool needs to be superchlorinated to 10 ppm. The chlorine residual was last measured to be 0.5 ppm. How many ounces of calcium hypochlorite (65% available chlorine) must added? _____ ounces.

SECTION V

CHEMICAL TESTS

Test kits are available for performing all chemical tests necessary for pool operation. Most tests can be conducted by using chemical reagents that are added to a sample of pool water. A colorimeter, an instrument that compares the color of the testing solution with the manufactured color standard, is typically used. The most accurate test results are possible only if the manufacturer's instructions are followed, all testing equipment is clean, all reagents are less than 1 year old and supplied by the manufacturer of the test kit. The reagents and colorimeter should be kept away from direct sunlight and intense heat. All colorimeter tests are conducted in the same manner. A sample of pool water is placed in a test vial, the chemical reagent is added according to the manufacturer's instructions and the subsequent color change is compared to the manufacturer's color standard. (Note: The water sample should be representative of the pool water; DO NOT collect the sample from an area in front of an inlet.)

A D-P-D (Diethyl-P-Phenylene Diamine) type colorimeter test kit must be used to measure the disinfectant residual. Use of the OTO (ortho-tolidine) colorimetric disinfectant residual test is not allowed. This is because time factors, interfering substances, and turbid water can produce inaccurate chlorine test results with the ortho-tolidine test. A chlorine residual must be maintained between 1.0 and 4.0 ppm as free available chlorine. Bromine must be maintained between 2.0 and 8.0 ppm. If the water temperature exceeds 85°F, a minimum free chlorine residual of 2.0 ppm and a minimum total bromine residual of 4.0 ppm must be maintained. Indoor pools are required to maintain a swimming pool water temperature between 76°F and 92°F.

Prepackaged test strips are available that determine chlorine, bromine, and pH levels. The test strips have small pads containing reagents that react with the pool water. The colored pads are compared to a color standard which is usually printed on the bottle label. <u>The test strips are not to be used in place of the DPD test kit as they are not sufficiently accurate.</u>

Bromine residuals can be measured in the same manner as chlorine residuals. Some test kits are precalibrated to directly read bromine levels in parts per million. Chlorine test kits may be used to determine the bromine residual by multiplying the result by two.

Cyanuric acid is a chemical used as a stabilizing agent against the effects of sunlight on chlorine. Cyanuric acid, which combines with chlorine, becomes a chlorinated cyanurate used for disinfection. A test kit is available to measure the cyanuric acid present in pool water. The cyanuric acid test kit contains a melamine solution that, when added to a sample of water, causes turbidity. The turbid solution is transferred to a calibrated vial with a dark disc on the bottom. The amount of cyanuric acid is measured by determining the amount of liquid needed to obscure the disc from sight. The ideal cyanuric acid level is between 25 and 50 ppm. The maximum cyanuric acid concentration is 100 ppm. If the cyanuric acid level exceeds 100 ppm, the pool water must be partially drained and replaced with fresh water until the cyanuric acid level is 50 ppm or less.

Colorimeter test kits are also available for testing the pH of swimming pool water. Kits using a phenol red solution will measure the water pH in a range between 6.8 and 8.4. Test kits should have at least 5 color standards in the range between 6.8 and 8.0 as a minimum. The swimming pool pH must be between 7.2 and 7.6.

Electronic meters that measure pH and chlorine levels are also available. In order to ensure their accuracy and reliability, these units require the operator to properly calibrate and maintain the units. As a result, the DPD test kits must be used.

The frequency of testing will vary with the type and usage of the pool. At a minimum, pool water must be tested twice per day in both the shallow and deep ends of the pool. Some commonly asked questions about testing the pool water follow:

1. The DPD chlorine test indicates there is no chlorine in the pool, but the chlorinator is on and operating. Why does this happen?

This is usually an indication of too much chlorine in the water, which causes the DPD to bleach out. Repeat the test with a diluted sample. To dilute a sample, fill half the sample vial with pool water and the other half with distilled water. This is a 1 to 1 dilution. Multiply the result by the appropriate factor: for a 1:1 dilution, multiply the result by 2; for a 1:2 dilution, multiply by 3, etc.

2. The DPD chlorine test sample turns cloudy when the first reagent is added. Will the test still work?

Yes. A sample usually turns cloudy when the first DPD reagent is added to water with high levels of hardness which precipicate the calcium. The cloudiness will not affect the test results and should disappear when the second DPD reagent is added.

3. When testing for pH, why do I get a blue/purple color instead of a yellow to red color when using phenol red?

A false pH reading may occur when high levels of chlorine (> 10 ppm) are present. The phenol red is converted to chlorphenol red which is dark purple in color when the water is alkaline (basic). To eliminate the chlorine interference, add 1 drop of chlorine neutralizer (thiosulfate) before adding the indicator.

QUIZ FOR SECTION V

1. Test kits use chemical _____ to perform the chemical tests necessary for pool operation.

2. An instrument that compares the color of the testing solution with a manufactured color standard is called a .

3. The State of Illinois requires the _____ type colorimeter test be used to measure the disinfectant residual.

4. The chlorine residual must be maintained between _____ and _____ ppm as free available chlorine.

5. Prepackaged test strips are sufficiently accurate to measure chlorine, bromine, and pH levels. T F

6. Chlorine test kits may be used to measure the bromine residual by multiplying the result by _____ .

7. Cyanuric acid is a chemical used as a stabilizing agent against the effects of _____ on chlorine.

8. The maximum cyanuric acid concentration in swimming pools is _____ ppm.

9. Test kits using a _____ solution will measure the pH in a range between 6.8 and 8.4.

10. The free chlorine residual and pH of the pool water must be tested at least _____ times a day in both the shallow and deep ends of the pool.

SECTION VI

MAINTENANCE

A pool operator should be sufficiently familiar with the operation of pool machinery to perform routine maintenance. The operator must also be able to determine when the services of a trained repairman are required. Repairs needed for any electrical system must be performed by a competent electrician.

A an ample supply of water must be continuously introduced into the recirculation pump during its operation to avoid cavitation. Cavitation involves air in the pump system that may result in severe damage to the pump and piping.

The hair and lint strainer, located in the pump suction line, must be cleaned frequently to avoid cavitation. When cleaning the strainer, the pump must be stopped prior to removing the strainer in order to avoid drawing air into the pump.

Adjustable water inlets should be checked frequently to ensure the flow through each inlet results in a uniform distribution pattern. The grates over any suction fitting should be checked frequently to ensure they are securely fastened.

The perimeter overflow systems and surface skimmers must be maintained in a clean and operable condition. Skimmer strainer baskets must be cleaned daily. At least 50 percent of the required recirculation rate of flow must be drawn over the perimeter overflow. The flow through each skimmer must be adjusted to maintain a vigorous skimming action at all times. The pool water level must be maintained at the mid-point of the skimmer throat or at an elevation of the perimeter overflow system so that effective skimming is accomplished.

The bottom and sides of the swimming pool must be maintained so that they are free from deterioration. The swimming pool interior must be painted as needed to ensure the pool has a watertight, light colored finish. The swimming pool should not be completely drained when the groundwater table is high because the empty pool may "float" out of the ground. In-ground pools are required to have hydrostatic relief valves which automatically open to let groundwater flow into the pool basin during the off-season. This prevents the pool from "floating" out of the ground.

Valves must occasionally be operated through their entire range to prevent dirt and corrosion from making them inoperable. This should be done while the pump is turned off. Valve stem packing glands must be tightened or repacked as necessary to prevent leakage. The glass and connecting tubes of the flowmeters must be kept clean and in good working order. Vacuum and pressure gauges need to be bled occasionally to prevent blockage.

Because of the potential danger involved in handling chlorine gas, even minor repairs of gas chlorinators should be made only by a person trained in servicing these units. The gas chlorinator and cylinders should be checked frequently for leaks. This is accomplished by swabbing over the suspected points with an ammonia water soaked rag. White smoke or fumes will indicate a chlorine leak. Never use plain water. In case of an emergency, the telephone number of the appropriate emergency personnel should be conspicuously posted.

If even small amounts of chlorine get into a person's eyes, flush them with lukewarm water for at least 15 minutes and seek medical attention. If chlorine gets on the skin, shower immediately, strip off the affected clothing in the shower and use large quantities of soap. Again, seek medical attention. If an individual inhales chlorine, place the person in fresh air, keep the person warm, and transport the person to a hospital. Watch the person's breathing and be prepared to administer artificial respiration and, if necessary, cardiopulmonary resuscitation (CPR).

QUIZ FOR SECTION VI

1. The hair and lint strainer is located on the pump's _____ line.

2. Water inlets should be checked frequently to ensure a uniform _____ pattern.

3. The perimeter overflow system shall be capable of drawing at least _____ percent of the required recirculation rate.

4. The pool water level must be maintained at the _____ of the skimmer throat.

5. The swimming pool interior must be painted a _____ finish.

6. _____ must be occasionally operated through their entire range to prevent dirt and corrosion from making them inoperable.

7. In order to check for leaks on gas chlorinators and cylinders, swab the suspected points with a rag soaked in .

8. If chlorine gets into a person's eyes, flush them with lukewarm water for at least _____ minutes.

SECTION VII

RECORD KEEPING AND SWIMMING POOL SAFETY

Maintaining pool operational records is a state requirement for pool operators. These records serve as an effective tool for locating and preventing operational problems. Keeping accurate daily records also will protect the pool operator from possible legal action. The Illinois Department of Public Health requires copies of the Daily Swimming Pool Operation Report to be available for inspection and kept at the facility for three years. See Attachment 5 for an example of the Daily Swimming Pool Operation Report and Attachment 6 for the instructions to complete the form.

As noted on the Daily Operational Report form, measurements of pH, turbidity, time of day the chlorine or bromine residual was taken in both the deep and shallow ends, flowrate, and when the filter was backwashed must be recorded daily. The remarks column should be used to note any additional information or unusual circumstances.

Swimming pools must be equipped with one U.S. Coast Guard approved ring buoy and one shepherd's crook at least 12 feet in length, per each 2,000 square feet of swimming pool water surface area. The safety equipment must be located in a readily accessible area of the pool enclosure. Ring buoys must have a rope attached to them that is equal in length to the widest width of the swimming pool or 50 feet, whichever is less. A lifeguard chair or station must be located so as to provide a clear unobstructed view of the pool area under surveillance. An emergency phone is required within 300 feet of the pool. A first aid kit must also be available. The contents of the first aid kit are listed in Attachment 3.

A protective wall, fence, or other barrier must enclose the entire swimming pool deck. The barrier must be at least four feet high and have no openings exceeding four inches in width. The barrier shall not allow for easy climbing. All entrances to the pool area shall be equipped with a door or gate which is self-closing and self-latching. Wading pools and sand areas must also be separated from the swimming pool deck by a barrier at least 3.5 feet high.

Where a change in the pool floor slope occurs from the shallow area to the deep area (the transition point), a safety rope must be secured with recessed anchors located a minimum of one foot towards the shallow end. Transition points must also be marked with a four inch wide stripe on the floor that is a contrasting color with that of the floor. If there is no transition point, the safety rope must be located where the water depth reaches five feet.

Depth markers must be located on the swimming pool deck and on the swimming pool walls around the perimeter of the pool. Depth markers shall be provided at the shallow and deep ends of the pool, the transition point, and the point of maximum depth. Depth markers must be spaced at no more than 25 foot intervals around the pool measured peripherally. The numerals of the depth markers must be a minimum of four inches high and be of a contrasting color with the background. In shallow areas, "NO DIVING" markers at least four inches high must be located at no more than 25 foot intervals around the pool perimeter.

Swimming pool stairs and pool ledges must be of a contrasting color or marked to contrast from the pool floor. Swimming after sunset at outdoor swimming pools is only allowed when proper lighting is provided. If the lights are inoperable, the pool must be closed at sunset. Outdoor pools must also close when lightning is present including a 15 minute period after the last lightning was observed. All indoor pools require lighting and should be closed if the lights are not functioning.

Lifeguards are required at swimming pools that allow bathers under 16 years of age to enter the pool area without supervision by a parent, guardian, or other responsible person at least 16 years of age or older. Where lifeguards are not provided, a sign must be posted that states "This facility is not protected by lifeguards. Persons under the age of 16 must be accompanied by a parent, guardian, or other responsible person at least 16 yeasr of age. Swimming alone is not recommended".

Section 820.330 of the Swimming Pool and Bathing Beach Code specifies when the pool operator must immediately close the pool. The following are examples of these conditions:

1. Conditions at the swimming pool or bathhouse create an immediate danger to health or safety, such as a missing, loose, or broken main drain grate.

2. Bacteriological results show the presence of fecal coliform, E. coli, beta hemolytic Streptococcus or Pseudomonas in any sample.

3. The turbidity of the pool water is such that the swimming pool main drain is not clearly visible.

4. The free chlorine residual is below 0.5 ppm or the total bromine residual is below 1.0 ppm or if the total chlorine concentration exceeds 5 ppm or the total bromine exceeds 10 ppm.

5. The recirculation pump and/or filter is inoperable.

6. The pH of the pool water is less than 6.8 or greater than 8.0.

7. When a patron has defecated or vomited in the pool. See Attachment 4 for clean up procedures.

8. When the mechanical disinfectant feeding device is inoperable.

9. When the deck lighting and/or underwater lighting is inoperable.

10. At outdoor pools when lightning is present or thunder is heard, including a 15 minute period after the last lightning was observed.

11. When a written notice to close is issued by the Department. This notice must be posted by the owner, operator, or licensee at the entrance to the pool. The pool shall remain closed until the Department has authorized the reopening of the pool.

Public pools are required to be licensed. This license must be posted at the pool entrance. If a person drowns or sustains an injury requiring hospitalization, the Department must be notified within 24 hours of the accident and a Swimming Pool and Bathing Beach Drowning or Injury Report must be submitted to the Department within 7 days. See Attachment 7.

QUIZ FOR SECTION VII

1. The State of Illinois requires a copy of the _____ be available for inspection and kept at the facility for a period of 3 years.

2. One U.S. Coast Guard approved _____ and one _____ shall be provided for each 2,000 square feet of swimming pool water surface area.

3. Wading pools and _____areas must be separated from the swimming pool deck by a barrier at least 3.5 feet in height.

4. Depth markers shall be spaced no more than _____ feet apart and have numerals at least _____ inches in height.

5. All entrances to the swimming pool area shall be equipped with a door or gate that is and _____ .

6. Outdoor pools must close at _____ if proper lighting is not provided.

7. If the main drain grate is missing, the pool may remain open. T F

8. If the water is turbid such that the main drain can not be seen, the pool must be closed. T F

9. Public pools are required to post their _____ at the pool entrance.

10. If a person drowns or sustains an injury requiring hospitalization, a drowning or injury report must be submitted to the Department within _____ days of the accident.

SECTION VIII

OUTDOOR POOL CARE

A. Pool Closing Procedures

To protect outdoor pools from damage due to severe weather, precautions must be taken at the time of the pool closing.

1. Thoroughly clean and grease unprotected metal parts of chemical feeders to protect against rust and corrosion.

2. Remove and drain all water from flow meters following the manufacturer's instructions and store in a warm dry area. Attach instructions for reinstallation.

3. Pressure gauges should be removed and stored in a warm dry area.

4. Filters must be backwashed thoroughly.

5. Completely drain filter shells and examine thoroughly for any repair and painting needs.

6. Diatomaceous earth (DE) filter elements must be cleaned and carefully examined for breaks or deterioration. If new elements are needed, they must be ordered for next season's opening.

7. When preparing the recirculation pump for the pool closing, the pump impeller casing must be drained and examined for wear. Order new parts if necessary.

8. Clean and lubricate the pump following the manufacturer's instruction. Cover the electric motor to protect it from moisture or remove and store in a warm dry area.

9. Drain all lines subject to freezing such as lines to the pool inlets, city water lines to the toilets, drinking fountains, showers, etc.

10. Drain all flush tanks on the toilets and urinals, the hot water heater and water storage tanks.

11. Drain mixing basins, filter piping, hair and lint strainers, and chemical solution tanks. Drain all water from suction cleaner hoses and store in a warm dry area.

12. Remove and store outside drinking fountains or cover them for protection.

13. Remove the diving boards and store them on a flat surface to prevent warping.

14. Identify and clearly label left over chemicals and store in a dry storage space accessible only to authorized personnel.

15. Leaving water in the pool or completely draining the pool is optional. If water is left in the pool, the water level must be lowered to at least six inches below the side wall inlets.

16. If the pool is completely drained, check the operation of the hydrostatic relief valve in the deep portion of the pool or the under-drain system if provided. This will protect the pool structure from damage that could occur from a high water table in the spring.

17. Determine any additional or miscellaneous equipment and materials needed for opening next season.

18. The master electrical switch must be turned off and securely fastened.

19. Securely bolt and lock the bathhouse doors and windows. Lock the fence gates around the pool and post "No Trespassing" signs.

B. Pool Opening Procedures

1. Approximately one month prior to opening the swimming pool, examine the pool walls, bottom and deck and repair any chips and cracks.

2. Flush all lines leading to and from the pool with fresh water. The pool design will dictate which method you will use, either a garden hose or other mechanical means.

3. Thoroughly clean the pool walls and bottom. Scrub all surfaces with a solution of 1.5 ounces of soap and 1.5 ounces of trisodium phosphate (TSP) per gallon of water.

4. To remove stains, clean the surface with a mixture of calcium or sodium hypochlorite and water. If a stronger cleaner is required, use a five percent solution of muriatic acid and water. Rinse well with water after use. Use extreme caution when handling muriatic acid. Do not mix muriatic acid and hypochlorite solutions!

5. Remove any scaling paint and if necessary, paint the pool a light color.

6. Refill the swimming pool after the paint is dry and remount diving boards, ladders, etc.

7. Re-install all equipment and piping that was removed and operate all valves to assure they are in proper operating condition. Repair and lubricate them as necessary.

8. Place the recirculation system in operation and backwash the filter. Operate the filter.

9. Check the chemical feeder and place it in operation. Check all gauges and flowmeters for operation and accuracy.

10. Test the pH and maintain it between 7.2 and 7.6. Test the free chlorine residual and adjust it to between 1.0 and 4.0 ppm. (For bromine: 2.0 and 8.0 ppm.)

QUIZ FOR SECTION VIII

1. Flowmeters should be _____ and stored in a warm dry area.

2. The filter must be _____ thoroughly, completely drained, and inspected for any repair needs.

3. The filter elements of _____ filters must be cleaned and examined for breaks or deterioration.

4. If the pool is drained, check the operation of the _____ valve or the under-drain system if provided.

5. _____ all lines subject to freezing.

6. The master _____ switch must be turned off and securely fastened.

7. Prior to opening, thoroughly examine the pool walls, bottom, and deck and _____ any cracks.

8. A five percent solution of _____ and water may be used to remove stains.

9. Do not mix muriatic acid and _____ solutions.

10. The water pH should be maintained between _____ and _____ . The free chlorine residual must be maintained between _____ and _____ ppm.

ANSWERS FOR SECTION I QUIZ

1. A. Basin, B. Pump, C. Filter, D. Chemical Feeder

2. 24 hours a day

3. T

4. T

5. Midpoint

6. T

7. T

8. F

9. T

10. T

ANSWERS FOR SECTION II QUIZ

1. Recirculation

2. Centrifugal

3. Feet of Head

4. Flowmeter

5. 4.67 Hours

6. No

7. 2.31

8. 1.13

9. A. P3 = P1 - P2; 27 psi - 2 psi = 25 psi; 25 psi X 2.31 Ft. Hd. per 1 psi = 57.75 Feet of Head

57.75 Feet of Head on the curve for the 3 HP pump indicates 140 Gallons per Minute

Flowrate = 140 gpm

ANSWERS FOR SECTION II QUIZ (CONT.)

9. B. P3 = P1 - P2; (20 psi X 2.31) - (-5" Hg X 1.13 Ft. Hd. per inch Hg) = 46.2 - (-5.65) = 51.85 Ft. Hd.

51.85 Feet of Head on the curve for the 1 HP pump indicate 60 Gallons per Minute

Flowrate = 60 gpm

10. Straight length, upstream, downstream

ANSWERS FOR SECTION III QUIZ

1. Solid

2. A. Pressure B. Vacuum

3. Filtration Rate

4. 250 gpm/69 sq. ft. = 3.62 gpm/sq. ft.

5. N

6. Backwashing

7. Air gap

8. 10 to 15 PSI

9. Diatomaceous Earth (DE)

10. 1.5 gpm/sq. ft., 2.0 gpm/sq. ft.

11. Pre-coated

12. 25 and 30 PSI

13. 12 and 16 Inches Hg

14. T

15. T

ANSWERS FOR SECTION IV QUIZ

1. 7.2 and 7.6

2. Soda Ash (Sodium Carbonate) or Sodium Hydroxide

3. Muriatic Acid (Hydrochloric Acid) or Sodium Bisulfate

4. 50 and 200 PPM

5. Iron

6. Chlorine

7. Gas, Liquid, Granular Powder or Tablet

8. Gas

9. Residual Chlorine

10. Hypochlorous Acid

11. 1.0 and 4.0 PPM

12. 2.0 and 8.0 PPM

13. Breakpoint

14. F

15. 76 and 92

16. 40,000/7,500 = 5.33 ounces
    10 - 0.5 = 9.5
    9.5 x 5.33 = 50.67 ounces
    50.67/ 0.65 = 77.9 ounces

    77.9 ounces of Calcium Hypochlorite

ANSWERS FOR SECTION V QUIZ

1. Reagents

2. Colorimeter

3. D-P-D (Diethyl-P-Phenylene Diamine)

4. 1.0 and 4.0

5. F

ANSWERS FOR SECTION V QUIZ (CONT.)

6. 2

7. Sunlight

8. 100 PPM

9. Phenol Red

10. Two

ANSWERS FOR SECTION VI QUIZ

1. Suction

2. Distribution

3. 50

4. Mid-point

5. Light colored

6. Valves

7. Ammonia water

8. 15

ANSWERS FOR SECTION VII QUIZ

1. Daily Swimming Pool Operation Report

2. Ring Buoy and Shepherd's Crook

3. Sand

4. 25, 4

5. Self-Closing, Self-Latching

6. Sunset

7. F

8. T

9. License

10. 7

ANSWERS FOR SECTION VIII QUIZ

1. Drained / Removed
2. Backwashed
3. Diatomaceous earth (D.E.)
4. Hydrostatic Relief
5. Drain
6. Electrical
7. Repair
8. Muriatic Acid
9. Hypochlorite
10. 7.2 and 7.6, 1.0 and 4.0 PPM

GLOSSARY

Algae – Plant life of many colors that grows in water in the presence of sunlight and carbon dioxide. In swimming pools it produces slippery spots and cloudy water.

Algicide – A chemical which kills algae.

Alkalinity – The amount of bicarbonate, carbonate, or hydroxide compounds present in a water solution. A measure of the pH buffering capacity of water.

Ammonia – A chemical compound of hydrogen and nitrogen that combines with free chlorine in pools to form chloramines or combined chlorine.

Ammonia Nitrogen – A chemical compound that reacts with chlorine to form chloramines. Causes eye irritation. Brought into pool by swimmers: Perspiration, urine, etc**.**

Automatic Controllers – Electronic equipment that senses water variables (primarily chlorine and pH) and controls feed systems to maintain desired levels.

Available Chlorine – Chlorine, both free and combined, that is active to some degree against bacteria in a pool.

Backwash – The process of cleaning a filter by reversing the flow of water through it.

Backwash Rate – The rate of flow required for efficient cleaning of the filter. Measured in gallons per minute per square foot of filter surface area (gpm/sq. ft.)**.**

Bacteria – Microorganisms that may be present in water.

Bactericide – Any chemical that kills bacteria.

Base or Basic – A chemical that neutralizes acids.

Bather Load – The maximum number of persons that may use the pool at one time without creating undue health or safety hazards.

Body Feed – Diatomaceous earth that is added to a filter element during the course of a filter run to help maintain filter porosity.

Breakpoint Chlorination – The point in a rising chlorine residual at which the concentration of available chlorine becomes great enough to oxidize all organic matter and ammonia compounds in a pool completely. Chlorine added thereafter will be in an uncombined or free state. It is characterized by a sudden drop in total residual available chlorine. The magnitude of the drop depends upon the amount of combined chlorine present and other factors.

Bridging – A buildup on diatomaceous earth filter elements to the point where the D. E. coats of two adjacent elements touch.

Bromine – A heavy dark reddish brown liquid in the same chemical family as chlorine. It is used as a bactericide in some swimming pools. The use of liquid bromine in pools is prohibited.

Bromthymol Blue – A chemical dye sensitive to changes in pH. Used to test pH over a range of 6.0 to 7.6. Turns from yellow to blue as pH increases.

Calcium Hardness – The calcium portion of the total hardness. About 70 - 75% of total hardness.

Calcium Hypochlorite – A compound of chlorine and calcium used in white granular or tablet form as a bactericide in pools.

Centrifugal Force – The outward force exhibited by anything in circular motion. Water is propelled through a circulation system by the circular motion of the pump impeller.

Chemical Feeder – A mechanism for automatic addition of chemicals to swimming pool water. Examples include proportioning pumps, injector type feeders, pot feeders operating on a water pressure differential, or a dry type feeder.

Chloramine – See Combined Chlorine.

Chlorine – A heavy green highly poisonous gas stored in heavy steel tanks. Used in swimming pools as a bactericide and algicide. Extreme caution must be used in handling.

Chlorine Demand – The amount of chlorine necessary to oxidize all organic matter present in pool water. (Chloramines, bacteria, algae, etc.)

Chlorine Residual – The amount of available chlorine remaining in pool water after the chlorine demand has been satisfied.

Coliform organisms – Bacteria found in the intestines of warm blooded animals. Their presence in pool water indicates disease-causing bacteria may be present.

Combined Chlorine – Chlorine that is available as a bactericide in water, but is combined with another substance, usually ammonia, to form chloramines. Combined chlorine is much less effective against bacteria.

Diatomaceous Earth – White powder composed of fossilized skeletons of one-celled organisms called diatoms. Used as a filter media for swimming pools. Also known as diatomite.

D.P.D. – Reagent containing Diethyl-P-Phenylene Diamine indicator used to test for residual chlorine in its various forms.

Effluent – The outflow of water from a filter, pump, or pool.

Equalizer Line – A line from below the pool surface to the body of a skimmer designed to prevent air being drawn into the filter when the water level drops below the skimmer inlet.

Feet of Head – A measurement of pressure or resistance in a hydraulic system that is equivalent to the height of a column of water that would cause the same resistance. The total head is the sum of all the resistance in a complete system when in operation.

Filter – A mechanical device for straining suspended particles from pool water.

Filter Cartridge – A disposable element, usually of fibrous material, used as a filter septum in some pool filters.

Filter Cycle or Run – The time of filter operation between backwash procedures.

Filter Media – Any fine grain material, carefully graded as to size, that entraps suspended particles as water passes through it.

Filter Rate – The rate of flow of water through a filter during the filtering cycle. Expressed in gallons per minute per square foot of effective filter area (gpm/sq. ft.)

Filter Sand – A type of filter media composed of hard, sharp silica, quartz, or similar particles with proper grading for size and uniformity.

Filter Septum – The part of a filter on which diatomaceous earth or similar filter media is deposited. Usually consists of cloth, wire screen, or other fine mesh material.

Filtration System – The entire system of pipes, pumps, and filters that allows water to be taken from the pool, filtered, treated, and returned to the pool.

Flowmeter – A device that measures pressure differential across a calibrated orifice and indicates the rate of flow at that point. Usually expressed in gallons per minute (gpm).

Free Chlorine – Amount of available chlorine remaining in pool water after the chlorine demand has been satisfied. See Chlorine Residual.

Gutter – Overflow trough at edge of pool. See Perimeter Overflow System.

Hardness (Water) – Refers to the quantity of dissolved minerals, chiefly calcium and magnesium compounds that may be deposited as scale in pipes, pools, and heaters.

Head – See Feet of Head.

Hydrochloric Acid – A very strong acid used in pools for pH control and for certain specific cleaning needs. A byproduct of the addition of chlorine gas to water. Use extreme care when handling. Also called muriatic acid when diluted**.**

Hydrogen Ion – The positively charged nucleus of a hydrogen atom. Its presence in water solution is used as a measure of acidity of the solution.

Hypochlorinator – A chemical feeder through which liquid solutions of chlorine-bearing chemicals are fed into the pool water at a controlled rate.

Hypochlorite – Refers to any compound containing the (OCL) radical. Most commonly refers to calcium or sodium hypochlorite in pool usage.

Hypochlorous Acid (HOCL) – An unstable acid with excellent bactericidal and algicidal properties. The active agent by which chlorine disinfects. Formed by dissolving chlorine gas, any hypochlorite, or other chlorinating agent in water.

Impeller – The rotating vanes of a centrifugal pump that move water through the filtration system.

Influent – Water flowing into a pool, pump, filter, chemical feeder, or other space.

Inlet – An opening or fitting through which filtered water enters the pool.

Main Drain – The outlet or outlets in the floor of the pool.

Make-up Water – Fresh water used to fill or refill the pool.

Manometer – An instrument that measures the pressure differential across an orifice by means of a column of mercury. Usually calibrated to read the flow rate in gallons per minute. A type of flowmeter.

Multiple Filter Control Valve – A special switching valve with a separate position for each of the various filter operations. Also known as Multi-port Valve.

Muriatic Acid – A dilute solution of hydrochloric acid.

Orifice – An opening through which water flows.

Organisms – Plant or animal life. Usually refers to algae or bacteria in pool water.

Orthotolidine – An organic test reagent that turns yellow-green in the presence of chlorine, bromine, or iodine.

Pathogen – A microorganism that causes disease in man.

Perimeter Overflow System – A channel at the normal water level normally extending completely around the pool water surface. Also known as an overflow gutter.

pH – A measure of the degree of acidity or alkalinity a solution possesses. A pH below 7.0 is considered acid. A pH above 7.0 is alkaline or basic. pH equal to 7.0 is neutral.

Phenol Red – An organic dye used to measure pH. When added to a water sample, its color is yellow at a pH of 6.8 and turns progressively deeper red in color as pH increases to 8.4.

Pool Depth – The distance between the pool floor and the perimeter overflow system lip or midpoint on the skimmer throat weir level.

Potable – Water that is safe and suitable for drinking.

P.P.M. – Parts per million. Calculated in weight units.

PSI – Pounds per square inch. A unit of measure for pressure or head.

Precoat – The layer of diatomaceous earth deposited on the filter septa at the start of a filter run with diatomite filters.

Pressure Differential – The difference in pressure between two points in a hydraulic system.

Pump Curve – A graph of performance characteristics of a given pump under varying flow and resistance factors. Provided by the manufacturer.

Pump Strainer – A device installed on the pump suction side that contains a removable basket designed to protect a pump from debris in the water. Also called a hair and lint strainer.

Rate of Flow – Quantity of water flowing past a given point in a unit of time. Usually measured in gallons per minute (gpm).

Recirculation Piping – The piping through which water flows from the pool to the filters and back to the pool.

Recirculation System – The entire system of pipes, pumps, and filters that allows water to be taken from the pool, filtered, treated, and returned to the pool. Also known as Filtration System.

Ring Buoy – A ring shaped floating buoy capable of supporting a drowning person.

Sand Filter – A filter using sand as a filter medium.

Scale – Calcium carbonate deposits that can be found in the filter, heater, or on the pool wall. Caused by excess water hardness.

Sequestering Agent – A chemical that keeps dissolved metals and minerals in solution when added to pool water.

Skimmer – A device other than an overflow gutter for continuous removal of surface water and floating debris from a pool to the filter.

Skimmer Weir – Part of a skimmer that adjusts automatically to small changes in water levels to assure a thin layer of surface water flows to the skimmer.

Slurry Feeder – A chemical feeder designed to handle a gritty slurry without clogging. Used for diatomite filters.

Soda Ash – Sodium carbonate used to raise pH and increase total alkalinity in pool water. Also used to neutralize hydrochloric acid resulting from the use of chlorine gas.

Sodium Bicarbonate – A chemical used to raise the total alkalinity content of a pool with little change in pH.

Sodium Bisulfate – A dry white powder that produces an acid solution when dissolved in water. Used to lower pH.

Sodium Hypochlorite – A liquid containing 12% to 15% available chlorine. One of the most commonly used products for chlorination. Produces hypochlorous acid when added to pool water.

Superchlorination – The practice of adding 3 to 5 times the normal chlorine dose to destroy algae or prevent problems after heavy bather loads or severe rains. Also known as breakpoint chlorination.

Swimming Pool Manager/Operator – The person responsible for the actual daily operation or supervision of the operation of the swimming pool.

Total Alkalinity – Measured as calcium carbonate. Acts as a buffer or stabilizer for pH.

Transition Point – The point of the pool floor where an abrupt change in slope occurs between the shallow and deep areas of the pool.

Turbidity – The degree to which suspended particles in pool water obscure visibility.

Turnover Rate – The time required to recirculate the pool water volume through the water treatment system.

Vacuum Cleaner – A suction device designed to collect dirt from the bottom of the pool. Some are self-propelled and others must be pushed or pulled across the pool.

Vacuum Filter – A filter, usually of diatomite or sand, through which water is pulled by a pump located on the effluent side of the filter.

Velocity – The rate of movement of water. Usually measured in feet per second (fps).

Venturi Tube – A tube mounted in a water line so as to cause a restriction of flow and a pressure differential that is proportional to the flow rate. The pressure differential can be used to measure flow or operate hydraulic chemical feeders.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH REGIONAL OFFICES

OFFICES THAT ADMINISTER THE SWIMMING POOL AND BATHING BEACH PROGRAM

ROCKFORD REGION
Illinois Department of Public Health
Div. of Environmental Health
4302 North Main Street
Rockford, Illinois 61103
(815) 987-7511
Fax: (815) 987-7822

PEORIA REGION
Illinois Department of Public Health
Div. of Environmental Health
5415 North University
Peoria, Illinois 61614
(309) 693-5360
Fax: (309) 691-2985

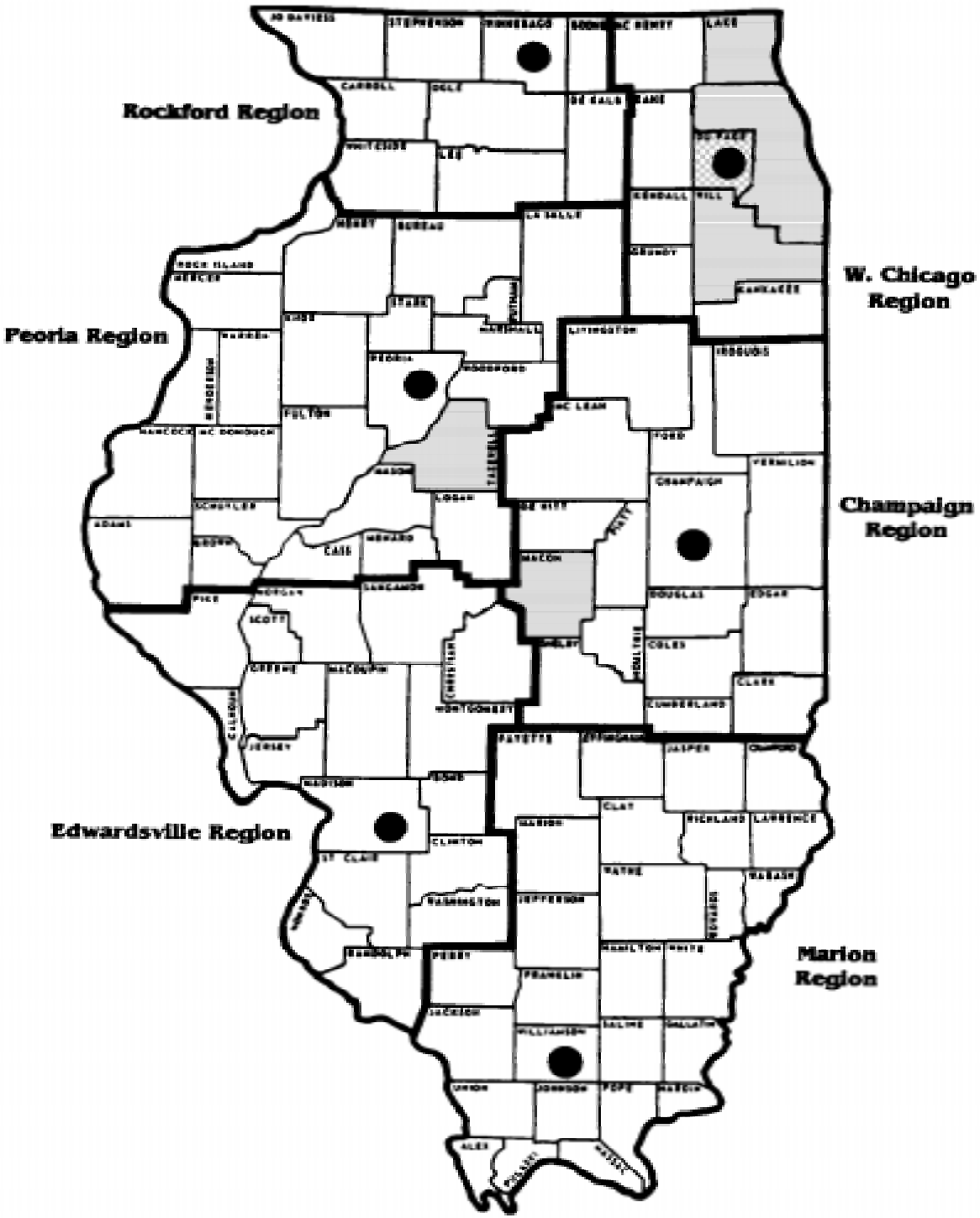
EDWARDSVILLE REGION
Illinois Department of Public Health
Div. of Environmental Health
22 Kettle River Drive
Glen Carbon, Illinois 62034
(618) 656-6680
Fax: (618) 656-5863

MARION REGION
Illinois Department of Public Health
Div. of Environmental Health
DEPARTMENT
2309 West Main
Marion, Illinois 62959
(618) 993-7010
Fax: (618) 993-6840

CHAMPAIGN REGION
Illinois Department of Public Health
2125 South First Street
Champaign, Illinois 61820
(217) 278-5900
Fax: (217) 278-5959

WEST CHICAGO REGION
Illinois Department of Public Health
Div. of Environmental Health
245 West Roosevelt Road, Building 5
West Chicago, Illinois 60185
(630) 293-6800
Fax: (630) 293-6908

CENTRAL OFFICE
Illinois Department of Public Health
Div. Of Environmental Health
525 West Jefferson Street, 3rd Floor
Springfield, Illinois 62761
(217) 782-5830
Fax: (217) 785-0253
TDD: 1-800-547-0466
(For hearing impaired use only)



APPROVED LOCAL AGENTS

CHICAGO DEPARTMENT OF PUBLIC HEALTH
1224 West Van Buren, 6th Floor
Chicago, Illinois 60607
(312) 746-8030
Fax: (312) 746-8099

COOK COUNTY DEPARTMENT OF PUBLIC HEALTH
1010 Lake Street, Suite 300
Oak Park, Illinois
(708) 492-2000
Fax: (708) 492-2911

DUPAGE COUNTY HEALTH DEPARTMENT*
111 North County Farm Road
Wheaton, Illinois 60187
(630) 682-7979
Fax: (630) 462-9261

LAKE COUNTY HEALTH DEPARTMENT
3010 Grand Avenue
Waukegan, Illinois 60085
(847) 360-6747
Fax: (847) 249-4972

MCHENRY COUNTY HEALTH

2200 North Seminary Avenue
Woodstock, Illinois 60098
(815) 334-4585
Fax: (815) 338-7661

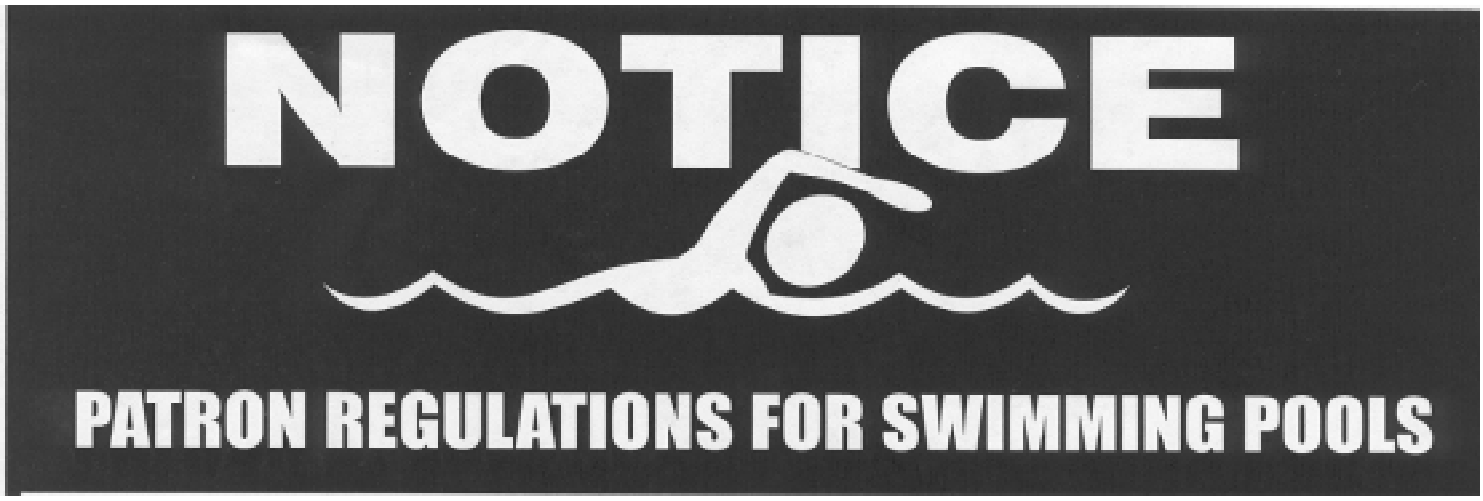
MACON COUNTY HEALTH DEPARTMENT
1221 East Condit Street
Decatur, Illinois 62521
(217) 423-6988
Fax: (217) 423-7436

TAZEWELL COUNTY HEALTH DEPARTMENT
21306 IL Route 9
Tremont, Illinois 61568
(309) 925-5511
Fax: (309) 925-4100

WILL COUNTY HEALTH DEPARTMENT
501 Ella Avenue
Joliet, Illinois 60433
(815) 727-8490
Fax: (815) 727-8484

* Administers program under the authority of an ordinance.

Attachment 1



- **Admission to the pool shall be refused to all persons having any contagious disease; any infectious conditions such as colds, fever, ringworm, foot infections, skin lesions, carbuncles, boils, diarrhea, vomiting, inflamed eyes, ear discharges; or any other condition that has the appearance of being infectious. Persons with excessive sunburn, abrasions that have not healed, corn plasters, bunion pads, adhesive tape, rubber bandages or other bandages of any kind also shall be refused admittance. A person under the influence of alcohol or exhibiting erratic behavior shall not be permitted in the pool area.**
- **The pool water is not suitable for drinking. Avoid swallowing pool water.**
- **Littering is prohibited. In addition, no food, drink, gum or tobacco is allowed in other than specifically designated and controlled sections of the pool area. Glass containers are prohibited.**
- **All persons are encouraged to take a shower before entering the pool area.**
- **Personal conduct within the pool facility must be such that the safety of self and others is not jeopardized. No running or boisterous or rough play, except supervised water sports, is permitted.**
- **Only clean footwear, baby strollers or wheelchairs are allowed in the pool area or bathhouse.**
- **Spitting, spouting of water, blowing the nose or otherwise introducing contaminants into the pool is not permitted.**
- **Glass, soap or other material that might create hazardous conditions or interfere with efficient operation of the swimming pool shall not be permitted in the swimming pool or on the pool deck.**
- **All apparel worn in the pool shall be clean.**
- **All children who are not toilet-trained shall wear tight fitting rubber or plastic pants.**
- **Diving in water less than five feet deep is not permitted except when allowed for competitive swimming and training.**
- **Caution shall be exercised in the use of diving facilities.**
- **Swimming is prohibited at outdoor swimming pools when thunder is heard or lightning is seen, including a 15-minute period after the last lightning or thunder is detected.**
- **If present, lifeguards are responsible for enforcing safety rules and responding to emergencies. Parents or guardians should supervise their children.**
- **No one should swim alone.**
- **The pool management has the authority to implement and enforce rules that are more stringent or that supplement those listed here.**

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Attachment 2

FIRST AID KIT CONTENTS

2 Units -- 3 inch Bandage Compress

2 Units -- Eye Dressing Packet

1 Unit -- Scissors -- Tweezers

1 Unit -- Adhesive Tape, 1 inch

1 Box Band-Aids of Various Sizes

Antiseptic

2 Pairs of Latex Gloves

1 CPR Barrier Shield

Procedures Following Fecal or Vomit Accidents in Pools

Fecal or vomit accidents in swimming pools can occur. With proper, timely action, the water quality of the pool can be maintained with minimal disruption to the swimmers. Most pathogens will be inactivated by the disinfectant concentrations required to be maintained in pools. The following steps must be taken following a fecal or vomit accident in a swimming pool:

1. All swimmers must exit the pool.

2. Remove as much of the solid material as possible. A strainer or vacuum may be used to remove any additional matter. If using the pool vacuum system, direct the water to the sanitary sewer, not the filtration system. All equipment must be cleaned and disinfected before reuse.

3. Superchlorinate the affected area of the pool. This may be done by adding powdered chlorine (HTH) or liquid bleach in the contaminated area to raise the chlorine level to 10 parts per million and mix with a stick or pole. For example, an area 15 feet in diameter and 5 feet deep, would require approximately 1 pound of HTH (65% calcium hypochlorite) or ½ gallon of liquid bleach (12% sodium hypochlorite). Pools with a volume greater than 50,000 gallons may elect to prohibit the use of the affected area only, but the above procedures must be followed. The pool must remain closed for a minimum of 30 minutes following superchlorination, or longer if necessary, for the disinfectant residual to return to prescribed levels.

4. Test the water to verify the pH is between 7.2 and 7.6, the free chlorine residual is between 1.0 and 4.0 parts per million or the free bromine between 2.0 and 8.0 parts per million, the water is clear with the main drain visible, and all of the recirculation system is operating properly. The pool may be reopened after these conditions have been met.

5. In the remarks section of the Daily Swimming Pool Operation Report, indicate the time the pool was closed as a result of the incident and the water quality values when the pool was reopened.

The above procedures greatly reduce the likelihood of disease transmission in most situations.

As with most public health issues, proactive steps to prevent such incidents are encouraged. Persons with any infectious diseases should not be allowed in the swimming pool. This would include persons with a cold, fever, and diarrhea. Section 820.360 of the Swimming Pool and Bathing Beach Code authorizes the pool operator to refuse admittance to such people and requires the patron regulations (Attachment 2) to be posted at the pool. The Department requires all children who are not toilet-trained to wear tight fitting rubber or plastic pants.

Attachment 4

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DAILY SWIMMING POOL OPERATION REPORT*

(*This form must be completed daily and a copy maintained at the pool for a period of three years.)

Swimming Pool Name _____ **City** _____ **County** _____ **Month** _____ **Year** _____

Day	Total Daily Number of Swimmers (Approx.)	pH				Turbidity		Disinfectant				Flow Rate	Filter Backwashed	Temperature	Combined Chlorine (Weekly	Cyanuric Acid (Weekly)	Completed by: (Initials)		REMARKS (Include comments relating to equipment failure, pool closure, injuries, weather, accidents, floating matter, etc.)
		7.2 to 7.6				Main Drain Visible from Deck		• Free chlorine between 1.0 & 4.0 ppm (2.0 & 4.0 if >85°) • Total bromine between 2.0 & 8.0 ppm (4.0 & 8.0 if >85°)				Required ___GPM							
		Shallow		Deep		√ = yes		Shallow		Deep		Actual							
		am	pm	am	pm	am	pm	am	pm	am	pm		(√)	°F	ppm		am	pm	
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This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 78-1149. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center.

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The values noted in the shaded areas indicate the required range. The pool must be closed if: main drain is not visible from the deck; chlorine residual <0.5 ppm or >5.0 ppm; bromine residual <1.00 ppm or >10 ppm; if pumps or filters are inoperable; pH < 6.8 or >8.0; other conditions as described in Section 820.330 of the Swimming Pool & Bathing Beach Code.

Instructions for Completing the *Daily Swimming Pool Operation Report*

1	2				3		4				5	6	7	8	9	10		11
Day	Total Daily Number of Swimmers (Approx.)	pH				Turbidity		Disinfectant				Flow Rate	Filter Backwashed	Temperature	Combined Chlorine (Weekly	Cyanuric Acid (Weekly)	Completed by:		REMARKS (Include comments relating to equipment failure, pool closure, injuries, weather, accidents, floating matter, etc.)
		7.2 to 7.6				Main Drain Visible from Deck		• Free chlorine between 1.0 & 4.0 ppm (2.0 & 4.0 if >85°) • Total bromine between 2.0 & 8.0 ppm (4.0 & 8.0 if >85°)				Required ___GPM					(Initials)		
		Shallow		Deep		√ = yes		Shallow		Deep		Actual							
		am	pm	am	pm	am	pm	am	pm	am	pm		(√)	°F	ppm		am	pm	

1. At the end of each day, record the approximate number of persons that used the pool.

2. At least twice daily, record the pH in the shallow and deep ends of the pool. The value should be between 7.2 and 7.6. It is necessary to close the pool for values less than 6.8 or greater than 8.0.

3. A least twice daily, check the water turbidity by determining if the main drain grate at the bottom of the pool is clearly visible. Place a check mark if it is and close the pool if it is not.

4. At least twice daily, the disinfectant concentration (either chlorine or bromine) must be sampled from the shallow and deep ends of the pool. Depending on conditions and pool usage, sampling for disinfectant residual and pH on a more frequent basis may be necessary. The acceptable range is indicated in the shaded area. The pool must be closed if the free chlorine level is less than 0.5 p.p.m. or the total chlorine is greater than 5 p.p.m. If bromine is used, less than 1.0 p.pp.m. or greater than 10.0 p.p.m., requires the pool to be closed.

5. Record the recirculation and flow rate as indicated by the flowmeter daily. If the flowmeter is not functioning, it must be repaired. In the shaded area, indicate the specific required flow rate for your pool. If you do not know what this should be, contact the inspector of your pool.

6. Indicate with a check mark those days when the filter is backwashed.

7. Record the pool water temperature daily. If the water temperature exceeds 85°F, a higher disinfectant concentration is required.

8. If chlorine is utilized as a disinfectant, record the combined chlorine concentration at least weekly. When the combined chlorine concentration exceeds 0.5 p.p.m., superchlorinate the pool.

9. If a stabilized chlorine product is utilized, record the cyanuric acid concentration at least weekly. When the cyanuric acid concentration exceeds 100 p.p.m., the pool must be partially drained (at least half) in order to reduce the cyanuric acid concentration to less than 50 p.p.m.

10. In the “Remarks” column, record incidents such as equipment failure or replacement, pool closings or accidents. If ozone or copper/silver ion generators are used, you can indicate the values in this column.

It is important that the above information be accurately recorded and the form be maintained at the facility for three years.

Illinois Department of Public Health
Swimming Pool and Bathing Beach
DROWNING/INJURY/ILLNESS REPORT

Section 820.315 of the Swimming Pool and Bathing Beach Code requires that all drownings, injuries or illnesses requiring hospitalization shall be reported to the Department within 24 hours. In addition, this form must be completed and returned to the office that serves your facility within seven days of the incident (see reverse side for correct office). A separate report shall be completed for each victim. In the event of a drowning, the Department's Springfield Office should be advised immediately at 217/782-5830. This form may also be used to advise the Department of illnesses, skin irritations or minor injuries associated with use of the facility.

FACILITY INFORMATION

The facility is licensed as
- □ Indoor Swimming Pool
- □ Outdoor Swimming Pool
- □ Bathing Beach

Type of Facility
- □ Educational
- □ Fitness/Health Club
- □ Apartment/Condominium
- □ State Owned Facility
- □ Hotel/Motel
- □ Municipal/County/Park District
- □ Country Club
- □ Other _____

Name of Facility _____

Street Address _____ City _____ County _____

DESCRIPTION OF INCIDENT

□ ILLNESS □ INJURY □ FATALITY

Name of Victim _____ Age _____ □ Male □ Female

Home Address _____ Telephone # _____

City _____ State _____ Zip Code _____

Description of incident, including date, time, circumstances (Attach additional sheets if necessary and any police reports if available.) _____

_____

_____

_____

_____

Describe supervision at time of accident, i.e., lifeguards, parents, etc. _____

_____

Was facility open for swimming at time of incident? _____

Name of medical facility that provided treatment or diagnosis

Name _____

Address _____ City _____

For additional information concerning this incident, the Department may contact

Name _____ Title _____ Telephone # _____

This report was completed and submitted by

Name _____ Title _____ Date _____

This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 78-1149. Disclosure of this information is mandatory.

IL 482-0821 P.O. #539318 Attachment 7 6/99