Operation Standards

And

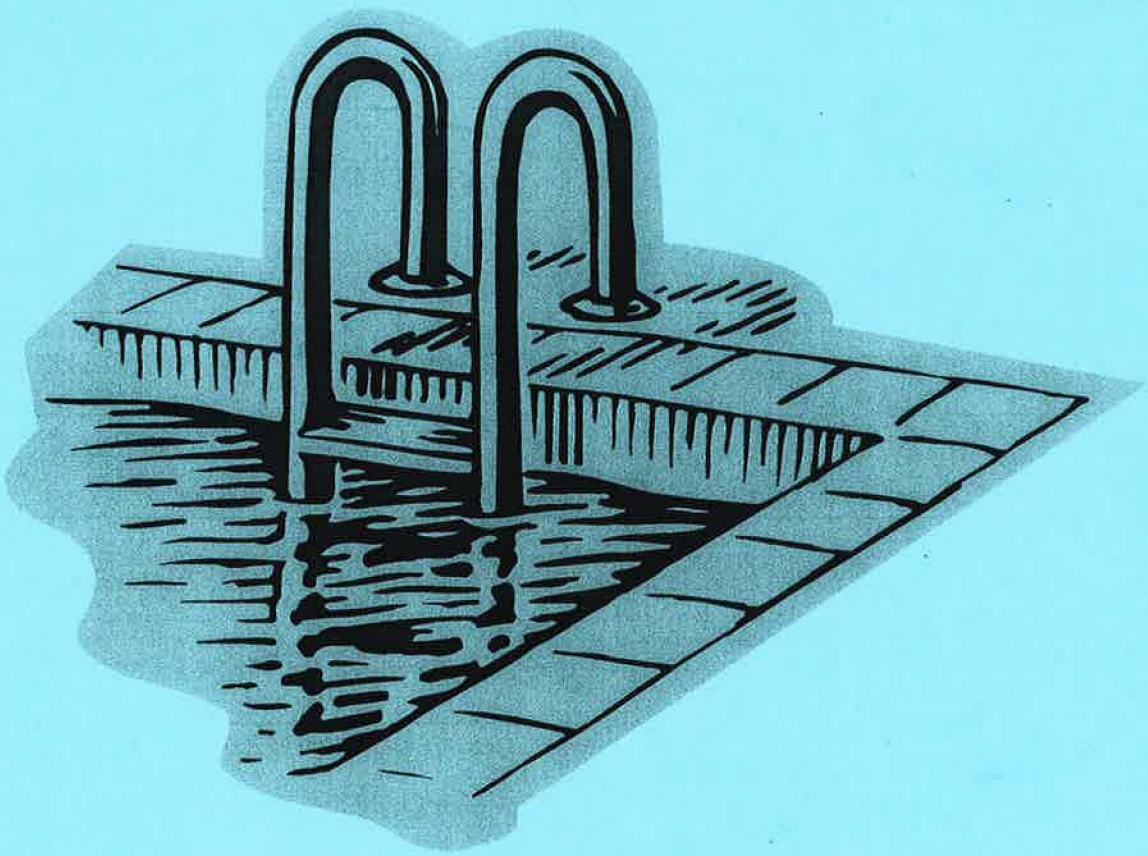
Facility Requirements

For

Swimming Pool and Spa Facilities

Southwestern District Health Unit

October 2014



Rule And Regulation No. 2

Of the

Southwestern District Health Unit

Dickinson, North Dakota

This rule and regulation regulates the inspection, operation, and monitoring requirements of the public and semi-public pool and spa facilities within the boundaries of the Southwestern District Health Unit.

SECTION 1. This rule and regulation requires that all public and semi-public swimming pool and spa facilities be annually inspected by the District Health Officer, or his designate, and provides regulations and standards necessary to make these swimming pools and spas safe and healthful.

SECTION 2. During its months of operation, each public and semi-public swimming pool and spa facility shall submit a water sample from the swimming pool or spa, to a laboratory certified by the North Dakota State Department of Health, for a bacteriological analysis. A minimum of one sample per month must be submitted for each pool and/or spa located at that facility. Samples must be submitted for each month that the pool and/or spa are open for use by the public. If a water sample tests unsatisfactory, the facility must then submit recheck water samples from the same pool/spa for bacteriological analysis until a satisfactory test is achieved for that month.

SECTION 3. The District Health Officer, or his designate, may temporarily close any facility that has been determined to be a health or safety hazard or in the event of a failure to comply with any of the requirements of this chapter, the department may abate or cause suspension of the use of such a facility until such time as the pool/spa facility is no longer deemed a health or safety hazard.

This rule and regulation made by the Southwestern District Health Unit Board of Health is necessary and proper for the preservation of public health and safety.

This rule and regulation was adopted by the Southwestern District Board of Health on March 18, 1993 and published on March 27, 1993 in accordance with State Law 23-05-03. Revisions to the Operations Standards and Facility Requirements were made and adopted by the Southwestern District Board of Health on December 13th, 2007.

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Chapter 1

1-1. As per Rule and Regulation No.2 Section 1 of the Southwestern District Health Unit, all public and semi-public swimming pools and spa facilities shall be inspected annually by the District Health Officer, or his designate.

1-2. As per Rule and Regulation No. 2 Section 2 of the Southwestern District Health Unit, during it's months of operation, each public and semi-public swimming pool and spa facility shall submit a water sample taken from the pool or spa to a bacteriological laboratory certified by the North Dakota Department of Health for bacteriological analysis of water. If a lab other than the Southwestern District Health Unit lab is used, a copy of the results shall be submitted to the Southwestern District Health Unit by the end of the month during which the sample was collected. A minimum of one sample per month shall be submitted for each pool and/or spa located at the facility. Samples shall be submitted each month that the pool and/or spa are open for use by the public. The bacteriological test must include a coliform analysis as well as a general bacteria analysis using a standard plate or R2A agar analysis method. If a water sample tests unsatisfactory, the facility shall then submit recheck water samples from that same pool/spa for bacteriological analysis until a satisfactory test is achieved for the month. A positive test for coliform bacteria or a voided test due to an overabundance of background bacteria count and/or a bacteria count greater than 200 on either the standard plate or the R2A agar analysis would constitute an unsatisfactory analysis.

1-3. As per Rule and Regulation No. 2 Section 3 of the Southwestern District Health Unit, the District Health Officer, or his designate, may temporarily close any facility that has been determined to be a health or safety hazard or in the event of a failure to comply with any of the requirements of this chapter, the department may abate or cause suspension of the use of such a facility until such time as the pool/spa facility is no longer deemed a health or safety hazard.

1-4. The Southwestern District Health Unit shall promulgate reasonable rules and regulations covering approval of the design and construction of swimming pools and covering the operation and maintenance of public and semi-public swimming pools and spa facilities for the protection and promotion of public health and safety.

1-5. The Southwestern District Health Unit shall enforce these rules and regulations.

Chapter 2

2-1. Definitions:

1. "Swimming pool" means any structure, basin, chamber or tank containing an artificial body of water for swimming, diving, recreational bathing, or wading. Unless otherwise noted, the terms "swimming pool" or "pool" will be used to refer to all swimming, diving, training, plunge, wading pools or interactive water fountains (where applicable).
2. "Wading pool" means any pool at a facility that is not the main pool and is not a spa and is no greater than 24 inches in depth.
3. "Training pool" means any pool at a facility that is not the main pool and is not a spa and is greater than 24 inches in depth, but is not greater than 3 feet in depth.
4. "Interactive water fountains" means any recreational area with no aboveground impoundment of water, that features water sprays, dancing water jets, waterfalls, dumping buckets, water cannons or any other such feature.
5. "Spa" means any whirlpool, hot tub, Jacuzzi, health pool or treatment pool.
6. "Residential swimming pool" means any swimming pool located on private property under the control of the homeowner, the use of which is limited to swimming or bathing by members of the homeowner's family or their invited guests.
7. "Public swimming pool" means any swimming pool usually open to any member of the public. Any swimming pool at which a fee is charged to swim shall be considered a public swimming pool regardless of where that pool is located. Pools located in schools shall be considered public swimming pools.
8. "Semi-public swimming pool" means any swimming pool (other than a residential pool or a public pool) that is intended for use collectively by numbers of persons for swimming or bathing regardless of whether a fee is charged for each use. . This definition includes swimming pools located in condominium and apartment house complexes as well as swimming pools and spas located at lodging facilities.
9. "Facility" means the site of any business, firm, club, park, city, school, institution or residence.
10. "Department" means the Southwestern District Health Unit, or it's authorized representatives.

Chapter 3

3-1. A person or organization may not construct, alter or reconstruct any public or semi-public swimming pool or spa without submitting the plans and specifications to the Southwestern District Health Unit for review. The plans shall be drawn to scale and accompanied by proper specifications so as to permit a comprehensive review of the plans including the piping and hydraulic details and shall include:

1. Plan and sectional views with all necessary dimensions of both the pool and surrounding area.
2. A piping diagram showing all appurtenances including treatment facilities in sufficient detail.
3. The specifications shall contain details on all treatment equipment, including pumps, chlorinators, chemical feeders, filters, strainers, interceptors and related equipment.

3-2. All public and semi-public swimming pools and spas shall meet minimum standards set forth in this document (Operation Standards and Facility Requirements for Swimming Pool and Spa Facilities). Pools and spas may be exempted from certain items at the discretion of the head of the Department of Environmental Health of the Southwestern District Health Unit.

3-2.1 Location, decking, basin, and facilities:

1. The swimming pool/spa shall have approved water supply and waste disposal facilities available. For outdoor pools, grass, earth and sand areas shall be excluded from the pool area. Overhanging foliage shall also be eliminated.
2. Materials for the pool basin must be non-toxic, durable, water proof, and easily cleanable. Color of the basin must be of light color to facilitate observation of swimmers by lifeguards.
3. Condition of pool basin: The basin must be of sound shape with no cracks, spalling or leaks. Paint shall not be peeling, flaking or otherwise damaged. No protrusions from the sides of the vertical walls shall be present.
4. Depth Markers: The depth of water in the pool shall be plainly marked at the points of maximum and minimum depths, at the break between the deep and shallow areas, and at intermediate depths spaced at not more than 25 foot intervals. The markers shall be placed on the pool wall at or above the water level and on the top edge of the deck. The markers shall be at least 4 inches in height and of a contrasting color and shall be located on both sides and both ends of the pool. For spas, depth markers of the same design shall be located on the deck on at least 2 sides of the spa indicating the maximum depth of the water.
5. Skimmers, Gutters, Baskets, and Inlets: Skimmers and gutters must have proper water height to function properly. Baskets must be kept clean to facilitate water flow and inlets must be kept operational to circulate pool water properly and maintain proper water levels.
6. Water depth: Approximately 3/4 of the pool area should be from 3 to 5 feet in depth, not including the diving area.
7. Diving Area: Diving areas shall have adequate depth and clearance for safe diving. The minimum required depth for any area of the pool where a diving board is located shall be 12 feet. The diving area shall extend 16.5 feet straight out from the tip of the diving board. There shall not be obstructions extending from the wall or the floor into the clear area of the diving portion of the pool. Extensively remodeled or newly constructed swimming pools with diving areas shall meet the standards of the American National Standards Institutes- Standard for Public Swimming Pools. The deep end of the pool must be separated by floats when it is used for diving. The floats must extend from one side to the other.

8. Diving boards: Public pools shall not have diving boards over 10 feet in height above the water level. If more than one board is used, they must be a minimum of 8 feet apart and at least 10 feet from any obstruction, pool walls, and at least 16 feet from any overhead obstructions.
9. Elevated diving boards for use by the general public may not be higher than ten feet above the water level. At least sixteen feet of unobstructed clearance that extends eight feet behind, eight feet to each side of and sixteen feet ahead of the center of the front tip of the board is required.
10. A wading pool shall have a maximum depth at the deepest point not greater than twenty-four inches.
11. Designed bather capacity for swimming pools and spas shall be computed as follows:
    a. Allow fifteen square feet of surface area per bather where water depth is less than five feet.
    b. Allow twenty square feet of surface area per bather where water depth is over five feet excluding three hundred square feet of pool surface area around each diving board.
    c. Allow ten square feet of surface area per bather for spas.
12. In pools less than forty-two feet in length, the rate of slope of the floor in the shallow portion may not exceed one foot in eight feet where the water depth is less than five feet. In pools of greater than forty-two feet in length, the rate of slope of the floor in the shallow portion of the pool may not be greater than one foot in fifteen feet where the water depth is less than five feet. There may not be sudden changes in slope in this area. The bottom slope of the pool at depths greater than five and one-half feet may not be greater than one foot in three feet. The bottom of the pool or spa shall slope to the main drain or the outlets. Joints between the floors and walls shall have a cove radius of at least one inch and may not exceed more than twelve inches if the water depth is less than six feet.
13. Ladders or stairs shall be located at the shallow end and at both sides of the deep end of the pool and at intervals not to exceed seventy-five feet. Ladder and stair materials shall be nonabsorbent and easily cleanable. Treads of stairs where used shall be of non-slip material. Step holes are not recommended. If step holes are used, they shall be of the recessed type and shall be self draining into the pool and easily cleanable. Steps, ladders, or step holes shall have a sturdy and easily visible handrail on either side and at the top leading out over the walk area. Handrails rails should be secured so as they do not pull out of the pool deck other than for maintenance or repair purposes.
14. A high, climb-resistant fence or other barrier at least six feet in height shall completely encircle the pool and deck area and shall be locked when unattended. Indoor pools without safety barriers may be located only in an area that can be locked during periods when it is not in use, or be located so as to be under direct supervision at all times. Whirlpools or treatment pools may be located in locker rooms, used solely by adults, without the required barrier if there is at least a railing around such pool to warn of its presence.
15. A spa not exceeding fifteen feet in maximum horizontal dimensions may have as few as one means of egress. Each means of egress in a spa shall meet the requirements of section 3-2.1 part 13.
16. A floating lifeline shall be provided at or within one foot of the break in grade between the shallow and deep portions of the pool, if the deep part of the pool exceeds 5 feet. It shall be at least three-quarters of an inch in diameter, securely fastened to the pool walls with a non-corrosive recessed connector, and marked with colored floats. The lifeline shall be in place at all times that the pool is open, except for those times

designated for lap swimming only.

17. For public pools, all walks and deck areas shall completely encircle the pool, shall be at least eight feet wide, and shall be restricted to use of those attired for aquatic activities only. A minimum width of four feet of walk area shall be provided for semi-public pools and shall extend entirely around the pool. A minimum deck width of two feet shall be provided on the sides and rear of any piece of diving equipment.
18. The finish texture of decks and walks shall be smooth, free of open cracks and/or broken areas, easily cleanable, of non-slip, nonporous material that is comfortable to bare feet. Carpet, floor matting, wooden walkways or other porous materials which interfere with floor cleaning or provide a place for bacteria and fungi to multiply are prohibited within eight feet of the pool, pool gutter or any floor drain.
19. All walks and decks shall be uniformly sloped to drains or points at which the water will have a free unobstructed flow to points of collection. Walks and decks shall have a slope of about one-quarter inch to the foot either away from the pool or to a deck drain system .
20. A spa shall be completely surrounded by a four-foot walkway. If the space is limited and the spa is no more than ten feet wide, a four-foot deck is required on its long side. A deck of at least twelve inches wide shall be maintained on the remaining sides. All elevated spas shall be equipped with guardrails.
21. Spas maintained in the same areas as swimming pools shall be separated from the pool by at least twelve inches and shall be protected with a railing to prevent the use of the separation as a walkway unless the walkway is eight feet or greater in width.
22. Hose bibs of not less than three-fourths inch, each equipped with an approved backflow prevention device, shall be located in the pool area, not more than 75 feet apart, for cleaning of the entire pool area.
23. All public swimming pools or spas shall be provided with separate male and female restrooms that are conveniently located for use by patrons of the pool or spa. All swimming pools or spas shall be provided with a shower that is conveniently located for use by bathers before they enter the swimming pool or spa.
24. A complete system of artificial lighting shall be provided for all pools, spas, bathhouses and dressing rooms that are to be used at night. All pools and spas that are used at night shall have an artificial light system in the swimming pool or spa basin sufficient to permit easy identification of objects in the pool. Area lighting shall provide at least 0.6 watt per square foot of pool and deck area (the equivalent of one 60 watt bulb per 10 square feet of deck area). The entire electrical installation shall meet the requirements of the state electrical code.
25. There shall be an absolute separation of the space used by spectators and that used by bathers. There should be no means by which the bather can directly enter the space reserved for the spectators or vice versa. The spectator area shall have a separate entrance. Galleries for spectators shall not overhang any portion of the pool surface.
26. Indoor pools and spas have the following additional requirements:
    a. Humidity: A relative humidity of forty to sixty percent shall be maintained at all times the pool or spa is open.
    b. Ventilation: Ventilation shall be provided to remove excess moisture and help control humidity, within the pool and dressing room areas, without subjecting bathers to drafts.
    c. Lighting: Artificial illumination shall be designed to maintain a minimum of seventy-five and preferably one hundred foot-candles of illumination at deck level.

d. Heating: The dressing rooms and shall be provided with heating and cooling facilities that is capable of maintaining a constant temperature level of between 70 and 75 degrees Fahrenheit. Poolrooms shall be equipped with heating and cooling facilities that are capable of maintaining a constant temperature level of 75 to 82 degrees Fahrenheit.

e. A telephone shall be available on the premises.

3-2.2 **Bathhouses** (if provided):

1. The bathhouse shall be located to provide entrance to the pool area near the shallow end of the pool only.
2. A dressing room area of not less than 3.5 square feet per person (based on designed bather load) shall be provided.
3. Floors shall be of smooth, non-slip, and impervious construction and sloped to drains at one-quarter inch per foot. Floor drains shall be installed in all areas subject to water accumulation .
4. Dressing room booths and furnishings shall be of simple design and shall be constructed of impervious and smooth materials that will permit hose cleaning. Partitions in booths shall terminate at least six inches above the floor.
5. Connections of three-quarter inch hose bibs equipped with proper backflow prevention devices shall be provided for area cleanup.
6. Bathhouse floors and surfaces shall be cleaned and sanitized daily.
7. Natural and/or artificial ventilation shall be provided.
8. A minimum lighting level of ten foot-candles at a point three feet from the floor shall be available during both day and night.
9. A clothing storage area shall be provided.
10. Warm and cold water under pressure shall be provided at all showerheads. The water heater and thermostatic mixing valve shall be inaccessible to the bathers and be capable of supplying two gpm of ninety degrees Fahrenheit water to each shower head. Hot water provided to the showers of a swimming pool or spa facility shall not be above 120 degrees Fahrenheit. One showerhead shall be provided for each forty swimmers expected at maximum pool load. Shower rooms shall be located adjacent to the dressing rooms and shall not be used as hallways between the dressing rooms and pool.
11. Soap dispensers shall be provided for each lavatory and between each pair of showerheads.
12. At least one lavatory with hot and cold running water shall be provided for every 60 bathers. Hot water provided to the lavatories of a swimming pool or spa facility shall not be above 120 degrees Fahrenheit. Lavatory numbers shall be based on the maximum designed bather load for the pool or spa.
13. At least one toilet and one urinal shall be provided for every 60 male bathers, and at least one toilet shall be provided for every 40 female bathers. Toilet/urinal numbers shall be based on the maximum designed bather load for the pool or spa.

3-2.3 **Safety- Personnel and Equipment:**

1. For all public (and semi-public pools of over two thousand square feet of surface area), one lifeguard shall be provided for each two thousand square feet of pool surface area or fraction thereof, or for every 25 swimmers, whichever is greater. If a pool requires more than one lifeguard, the lifeguards shall be positioned on opposite sides of the pool. Lifeguards are not required if the pool is less than two thousand square feet in water surface and is classified as semi-public.

2. All lifeguards shall be certified by the Red Cross, YMCA or equivalent agency (approved by the Southwestern District Health Unit).
3. It is recommended that a person, or persons, supervising the daily operation of each public swimming pool and each semi-public pool of more than two thousand square feet of water surface, have lifeguard training as well as training in CPR, first aid, pool equipment operation and pool sanitation. An individual can receive CPR, first aid and lifeguard training through the Red Cross or other agency qualified for training in these areas. Training in equipment operation and pool sanitation can be gained by attending a CPO certification (Certified Pool/Spa Operator as certified by the National Swimming Pool Foundation) course.
4. Each public pool and semi-public pool of greater than two thousand square feet of surface area shall have present at all times while open to public use a person that is in charge of pool operations. This person shall be familiar with procedures for water testing and shall be familiar with equipment operation and maintaining proper pH, water clarity, and free and total chlorine levels.
5. At least one set of lifesaving equipment shall be provided consisting of:
    a. One or more poles, least one-half the width of the pool plus two feet (but need not exceed sixteen feet in length) having a Shepard's crook with an aperture of at least eighteen inches between the tip of the hook and the pole.
    b. Two or more U. S. Coast Guard approved throwing rings having a minimum diameter of eighteen inches equipped with one-quarter inch line in a length not less than one and one-half times the width of the pool.
6. The use of cell phones by lifeguards while on duty is prohibited unless it is necessary for emergency purposes. Other personal electronic devices (i.e. i-pods, etc) should also be restricted by personnel while on duty, for the protection of the swimmers.

3-2.4 **Water supply and plumbing:**

1. The water supply serving the pool shall meet the requirements of the North Dakota Department of Health for potable water. All portions of the potable water supply serving the pool and auxiliary facilities shall be protected against backflow. Potable water introduced into the pool, either directly or through the recirculation system, shall be supplied through an air gap, an approved-type backflow prevention device, or other approved means.
2. All piping and plumbing shall be installed in compliance with the requirements of the North Dakota State Plumbing Code.
3. The recirculation system shall consist of pumps, hair and lint catchers and filters, necessary pipe connections to the inlets, outlets and skimmers of the pool and a system for backwashing of the filters. A pool that has only one main drain shall have an anti-vortex cover securely attached to the drain. The re-circulation, skimmer and overflow systems shall meet the current ANSI/NSPI design standards of when the pool was designed and built. As an integral part of the system, equipment shall be provided for disinfecting the water and adding any necessary chemicals and makeup water.
4. The recirculation system of a pool shall have adequate filtration and pumping capacity to provide one complete turnover of the water every six hours or less. The turnover time for a wading pool, plunge pool or health pool shall be no more than two hours, and shall be less, if necessary, to meet the hydraulic requirements for a surface skimmer system. The turnover time for a spa shall be no more than thirty minutes. The turnover time for a training pool shall be less than four hours.
5. Suction cleaners either of the portable type or as part of the permanent piping system are required.

6. The water supply to a wading pool shall be filtered and chlorinated water, and shall have a recirculation system. The water supply to a training pool shall be filtered and chlorinated water, and shall have a recirculation system.
7. The water supply to an interactive water fountain shall be filtered and chlorinated water, and shall have a recirculation system.
8. A rate-of-flow indicator capable of measuring at least one and one-half times the designed flow rate shall be installed on the filter effluent line leading to the pool or spa. The indicator shall be calibrated to read in gallons per minute and capable of measuring both for filtration and for backwash where applicable.
9. A hair and lint catcher of acceptable design shall be provided on all recirculation systems except where the filter is located prior to the pump suction.
10. Pool heaters shall be installed on a bypass line on the discharge side of the filtration system. A heater capacity of from seven to ten BTU per hour per gallon of water is recommended. Swimming shall not be permitted when the water temperature falls below sixty-five degrees Fahrenheit or when the water temperature exceeds ninety degrees Fahrenheit. Water temperatures of whirlpools or health pools shall not exceed one hundred five degrees Fahrenheit.
11. All wastewater lines emptying into a sewer system shall be backflow protected.

3-2.5 **Filtration and disinfection:**

1. All pools and spas shall have a filter system. The filter shall be one of three types: sand, diatomaceous earth or cartridge. Other filter types will be considered on a case by case basis and may be acceptable, provided that they are approved by the Southwestern District Health Unit. All filters shall be accompanied by pressure gauges that can be used to determine loss of head in the filter medium. For cartridge filtration systems, an extra set of clean, useable cartridges shall be available.
2. All filters shall comply in all respects with the standards of the National Sanitation Foundation covering filters.
3. Equipment shall be provided to adequately disinfect the pool or spa. The disinfection equipment shall operate 24 hours per day at all times during the pool or spa's season of operation. The means of disinfection shall provide a level of residual disinfection equivalent to that provided by 2-3 mg/L of free chlorine. Chlorine, bromine, iodine or another means approved by the Southwestern District Health Unit may be used in swimming pools.
4. Every pool and spa shall be provided with approved testing equipment for determination of disinfection residuals and hydrogen ion (pH) concentration. The disinfection residual testing equipment shall have a range that encompasses the minimum effective level and the maximum safe level of the agent used for disinfection. If more than one agent is used, the pool shall be provided with the proper testing equipment for all agents used. When chlorine is used as the disinfection agent, the testing equipment shall have a minimum detection range of between zero and five milligrams per liter of (mg/L or ppm-parts per million) free chlorine. The test equipment shall also have the ability to test for total chlorine in the same range. The test equipment shall be capable of giving chlorine residual readings in increments no larger than 0.5 mg/L. The hydrogen ion tester shall have a pH range of from 6.8 to 8.4 in increments not greater than 0.2. The test kit shall also have proper reagents for testing calcium hardness, alkalinity and cyanuric acid (if used with the disinfection medium). Reagents in test kits shall be replaced every twelve months or at the beginning of each swimming season. Test strips or sticks are not considered suitable for use in place of a test kit.
5. Stabilized chlorines (such as sodium dichloro-s-triazinetrione or trichloro-striazinetrione)

shall not be used as a disinfection medium in indoor swimming pools or spas. Swimming pools or spas that use stabilized chlorine for disinfection shall maintain cyanuric acid levels between 30 and 50 mg/L. If cyanuric acid levels rise above 100 mg/L, the pool or spa shall close until the cyanuric acid level is decreased to below 50 mg/L.

6. Chlorine gas, when used as the chlorine source, shall be supplied by means of a cylinder mounted vacuum operated gas chlorinator of the fail-safe type. Automatic switching tanks and/or metered valves may be used. All swimming pool operators that handle chlorine gas shall meet all current and future certifications required for the safe handling of chorine gas.
7. The housing for the gas chlorinator and all appurtenances shall meet the following specifications:
    a. Be a separate, reasonably gas-tight, corrosion-resistant, and mechanically vented enclosure or room. The room shall be at ground level and permit easy access to all equipment. The door of the room shall open to the outside and shall not open to the swimming pool or equipment room area. Other than gas chlorine in cylinders, no chemicals may be stored in the gas chlorine room.
    b. The exhaust fan shall be capable of one or more air exchanges per minute. The fan shall be located at floor level or equipped with an intake extending to within six inches floor level exhausting to an outside atmosphere in an unrestricted area. Fresh air intake louvers near the top of the enclosure are required.
    c. A clear glass window shall be installed in the door or wall of the chlorinator room to permit the chlorinator to be viewed without entering the room.
    d. The chlorine room shall have artificial lighting at least equivalent to 1 watt per square foot of floor area. Electrical switches for the control of artificial lighting and ventilation shall be located on the outside of the chlorine room.
    e. A scale shall be provided for weighing chlorine cylinders.
    f. Safety chains shall be provided for securing the chlorine cylinders, and cylinders shall be secured at all times.
    g. A cylinder wrench for turning off the cylinder shall be attached to the top of each cylinder.
    h. A bottle of ammonia shall be provided for use in detecting small leaks.

3-2.6 **Operational practices:**

1. The recirculation system shall be operated continually 24 hours per day during the normal season of operation.
2. A pH value between 7.2 and 7.8 shall be maintained at all times while a pool or spa is open for use.
3. If the free chlorine level of a pool or spa falls below 1.0 mg/L, the pool or spa shall be closed until the level can be raised above 1.0 mg/L. If a compound or process other than chlorine is used for disinfection, the residual maintained shall be equivalent to the effectiveness of 1.0 mg/L of free chlorine.
4. A free chlorine residual of between 1.5 to 3.0 mg/L shall be maintained for all pools that use chlorine for disinfection. Free chlorine residuals of 2.0 to 5.0 mg/L shall be maintained in all spas. If a pool or spa uses a disinfection method other than chlorine, the method shall provide a disinfection residual equivalent to that provided by the required free chlorine residual level. Any disinfection residual level that falls outside the previously specified range shall be a violation of 3-2.6, and may be a basis for pool closure.
5. The difference between the free and total chlorine levels should not exceed 0.5 mg/L for all

pools.

6. In the event that a pool or spa is contaminated with fecal matter, it shall be immediately closed to bathers. Disinfection procedures found in Appendix B shall be followed before the pool or spa is re-opened. Chlorine levels shall be between 2-3 mg/L before re-opening the pool.
7. Infants and bathers requiring diapers shall use approved "Swim Diapers".
8. Bathers having any communicable infection shall not be permitted to use the pool.
9. Pool rules shall be posted in an easily viewed location in the pool area, and shall be printed with print large enough to be seen without the aid of eyeglasses.
10. The pool and related facilities shall be maintained in a clean manner at all times.
11. The pool water surface shall be kept free of film and floating dirt and the pool bottom shall be kept free of sediment.
12. The decking shall be sanitized daily with a solution of .25-1 % chlorine or equivalent sanitizer.
13. All patrons shall be required to take a cleansing shower before entering the pool.
14. A daily record shall be kept detailing operation of the recirculation system, chemical additions, pH, free and total chlorine residuals, and bather load. Chlorine and pH testing shall be performed and recorded at least three times daily. Records shall be kept on site for a period of 5 years.
15. All swimming pools and spas shall be super chlorinated to between ten to fifteen mg/L for at least six hours prior to seasonal startup and at any time during seasonal operation when needed for algae control, disinfection or chemical balance.
16. Water in a pool or spa shall be of sufficient clarity that the main drain or a standard test disc placed in the deepest area of a pool is readily visible from the deck. If the main drain or test disk is not visible, the pool shall be closed until such time as proper water clarity can be achieved and maintained.
17. The ideal water temperature in a pool is 76-78 degrees F. Temperatures over 80 degrees F may lead to bather discomfort and aid in algae growth. Swimming should not be permitted when the water temperature is below 65 degrees F. Spa water should not exceed 105 degrees F.
18. A monthly microbiological analysis must be conducted for each pool and spa during each month that the facility is open to the public. If the initial monthly test fails, then recheck samples must be submitted until a satisfactory result is achieved. A satisfactory test means no presence of coliform bacteria, a background bacteria count of less than 200 and a standard plate or R2A count of less than 200/mL.

If you have any questions about your pool operations, please call us at the Southwestern District Health Unit, 2869 3rd Ave. West, Dickinson, ND 58601. Our telephone is (701)-483-0171 or toll free at 1-800-697-3145.

APPENDIX A:

IDEAL SWIMMING POOL CONDITIONS:

Total Alkalinity (a measure of resistance to change in pH) 80 – 120 ppm*
Calcium Hardness (a measure of calcium ions in the water) 200 – 250 ppm
Free Chlorine..... 1.0 - 2.0ppm
Water Temperature..... 76 - 78 degrees F
Air Temperature..... 81 - 85 degrees F
pH (a measure of acidity).7.4 - 7.8

*If using calcium hypochlorite, sodium hypochlorite or lithium hypochlorite as chlorine source, alkalinity levels should be from 80-100 ppm. If using chlorine gas, dichlor or trichlor keep the alkalinity level from 100-120 ppm.

ADJUSTING WATER BALANCE:

To raise pH..... add soda ash (calcium carbonate)

To lower pH..... add muriatic acid (hydrochloric)

To raise alkalinity..... add soda ash or sodium bicarbonate

To lower alkalinity..... add muriatic acid

To raise calcium hardness .... add calcium chloride

To lower calcium hardness..... add trisodium phosphate

To raise chlorine..... add chlorine

To lower chlorine..... add sodium thiosulfate

PROBLEMS ASSOCIATED WITH IMPROPER WATER BALANCE:

Improper pH - too low pH- chlorine dissipates more rapidly, more eye irritation, possible corrosion of pool fixtures, paint and plumbing.

too high pH-scaling, slows chlorine activity, can cloud water, detrimental to filters.

Improper alkalinity- Same as improper pH.

Improper calcium hardness - too low - difficulty in maintaining proper water balance.
- too high - scaling, cloudy water, crystals forming on the inside walls of the pool.

Improper chlorine - too low - bacterial and algae growth
- too high - eye irritation, pH hard to manage, possible corrosion to plumbing.

AMOUNT OF CHEMICAL NEEDED TO TREAT 10,000 GALLONS OF WATER
-Determine the number of gallons in the pool, divide that number by 10,000 and multiply the result by the amounts from the tables below.

To Increase Free Available Chlorine 1 ppm:
Chlorine gas 1.3 oz
Calcium hypochlorite 2 oz
Sodium hypochlorite 13 fl oz
Lithium hypochlorite 10.5 oz
Dichlor 2.5 oz
Trichlor 1.5 oz

To Increase Total Alkalinity 10 ppm:
Sodium bicarbonate 1.5 lbs

To Decrease Total Alkalinity 10 ppm:
Muriatic acid 21.12 fl oz (2/3 qt)
Dry acid (sodium bisulfate) 1.5 lbs

To Increase pH From 7.2-7.4:
Soda ash 6 oz

To Decrease pH From 7.8-7.6:
Muriatic acid 12 fl oz

To Increase Calcium Hardness 10 ppm:
Calcium chloride (100%) 1 lb
Calcium chloride (77%) 1.25 lb

To Neutalize 1 ppm of Free Available Chlorine:
Sodium thiosulfate 1 oz
Sodium sulfate 3.25 oz

CHEMICALS:

Most chemicals may be obtained from your pool supply company. Some may be obtained locally. Muriatic acid may be obtained from a radiator shop and calcium chloride may be obtained from a tire store or farm implement dealer.

BASIC RULES FOR MIXING AND ADDING CHEMICALS:

Always dilute any chemicals that are to be added to the pool water. The easiest way to do this is to mix the chemical into 5 gallons of water. **NEVER ADD WATER TO ACID, ALWAYS ADD ACID TO THE WATER.** (If water is added to acid, a violent reaction may occur and splash concentrated acid back at you.) After the chemical has been thoroughly mixed, let the solution set for 15 - 20 minutes. Acid may not need to be stirred but the solid chemicals should be stirred to speed up dissolving. After any solids have precipitated to the bottom of the bucket, pour the liquid into the pool over an equal area, don't pour the entire batch into one spot. The chemical should be spread out over the entire area to facilitate mixing of the chemical with the pool water.

When mixing calcium chloride, soda ash and calcium hypochlorite; (never together) let the stirred mixture set for a few more minutes and you will notice some mudlike solids settle out in the bottom of the pail. This mud is of no use to the pool water. The chemicals needed have already been drawn out of the powder and are mixed within the liquid in the bucket. When pouring the solution into the pool, only pour

the liquid portion from the pail. The mud from the bottom of the pail should be discarded. If it is poured into the pool, it may cause cloudiness or plug filters.

When adding the acid to the pool, it should always be diluted in water. Once again NEVER ADD WATER TO ACID; ALWAYS ADD ACID TO WATER. The size of a swimming pool determines how much acid can be safely added to the water. Pools with a capacity of 175,000 gallons or less should only receive 3 gallons or less of acid per 24 hour period. When treating a pool for high alkalinity before swimming has started for the season, add acid on alternate consecutive days and allow the acid to work for 48 hours. It can take up to 48 hours for the acid to work into the water balance. Test your alkalinity before adding any more acid.

When adding chemicals to your pool, some cloudiness may occur. This is to be expected until the water has had a chance to work and balance. This should clear up within 24 - 48 hours.

APPENDIX B:

FECAL DECONTAMINATION PROCEDURES
The Southwestern District Health Unit must be notified immediately, of any fecal release.

Formed stool (solid, non-liquid)
1. Evacuate all bathers from pool or spa. Do not allow anyone to enter contaminated pools until decontamination procedures are complete.
2. Remove as much fecal material as possible using a net or scoop. Vacuuming fecal material is not recommended.
3. Raise free available chlorine level to 10 mg/L for at least 30 minutes.
4. Document the incident in the daily records.
5. Do not allow bathers back into the pool or spa until the free chlorine residual is between 2-3 mg/L (if necessary, sodium thiosulfate may be used to reduce the free chlorine residual, see Appendix A).

Diarrhea (liquid stool)
1. Same as 1 for solid stool.
2. Same as 2 for solid stool.
3. Raise free available chlorine to 20.0 mg/L and maintain this level for 8.0 hours.
4. Backwash the filter thoroughly. Discharge the effluent directly to waste. Where appropriate replace the filter media.
5. Document the incident in the daily records.
6. Do not allow bathers back into the pool or spa until the free chlorine residual is between 2-3 mg/L (if necessary, sodium thiosulfate may be used to reduce the free chlorine residual, see Appendix A).

If Cryptosporidium is suspected
1. Same as 1&2 above.
2. Raise free chlorine concentration level to 20 ppm and maintain that level for 13 consecutive hours. The level can be raised to 10 ppm free chlorine and be maintained for 26 consecutive hours. During this time, the pH should be maintained at 7.5 or less and the water temperature be maintained at 77 degrees F. or higher.

If Cryptosporidium is suspected *- cont.*

3. Make sure that the filtration system is operating during this time.
4. After the holding time, backwash the filter thoroughly making sure that the effluent is discharged directly into the wastewater line. If appropriate, replace the filter media.
5. Swimmers can return to the pool when the free chlorine and pH levels have returned to the normal operating range.

APPENDIX C:

Calculating the Capacity of a Pool

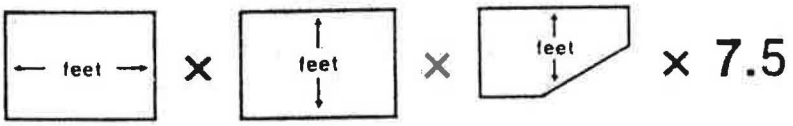
1st Determine Average Depth (in Feet)

(Depth at shallow end + Depth at deep end) ÷ 2 = Avg. Depth

2nd Determine Pool Capacity

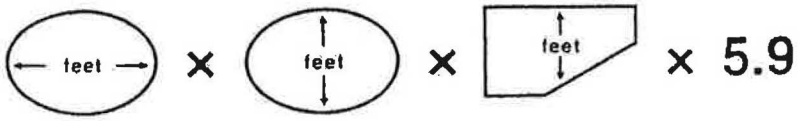
RECTANGULAR/SQUARE FORMULA

Length x Width x Avg. Depth x 7.5 = Gallons of Water



OVAL/ROUND FORMULA

Long Short
Diameter x Diameter x Avg. Depth x 5.9 = Gallons of Water



APPENDIX D:

TABLE 1

TO RAISE CHLORINE LEVEL ONE PART PER MILLION (1 ppm)

GALLONS OF WATER	% ACTIVE CHLORINE IN PRODUCT									
	5%	10%	12%	35%	50%	65%	80%	85%	90%	100%
100	½ TBS	¼ TBS	¼ TBS	⅓ tsp	⅛ tsp	1/10 tsp	1/12 tsp	1/13 tsp	1/14 tsp	
1000	⅓ cup	⅕ cup	⅛ cup	2⅙ tsp	2 tsp	1 tsp	¾ tsp	¾ tsp	⅔ tsp	.0083 lb
10000	3⅕ cup	1⅗ cup	1⅓ cup	.238 lb	.167 lb	.128 lb	.104 lb	.098 lb	.093 lb	.083 lb

TABLE 2

TO RAISE pH WITH SODA ASH (SODIUM CARBONATE)

GALLONS OF WATER	DROPS OF BASE DEMAND REAGENT ADDED									
	1	2	3	4	5	6	7	8	9	10
100	¼ tsp	½ tsp	1 tsp	1¼ tsp	1½ tsp	2 tsp	2 tsp	2½ tsp	1 TBS	1 TBS
1000	1 TBS	2 TBS	3 TBS	¼ cup	⅓ cup	⅓ cup	½ cup	½ cup	⅔ cup	⅔ cup
10000	5 oz	10 oz	15 oz	1.25 lbs	1.56 lbs	1.8 lbs	2.2 lbs	2.5 lbs	2.8 lbs	3.1 lbs

TABLE 3

TO LOWER pH WITH MURIATIC ACID (HYDROCHLORIC ACID - 20° Baume')

GALLONS OF WATER	DROPS OF ACID DEMAND REAGENT ADDED									
	1	2	3	4	5	6	7	8	9	10
100	½ tsp	1 tsp	1½ tsp	2 tsp	2½ tsp	1 TBS	3½ tsp	4 tsp	1½ TBS	1½ TBS
1000	1½ TBS	3 TBS	⅓ cup	½ cup	½ cup	½ cup	¾ cup	¾ cup	1 cup	1 cup
10000	1 cup	1 pt	1½ pts	1 qt	2½ pts	3 pts	3½ pts	2 qts	4½ pts	2½ qts

APPENDIX D: cont.

TABLE 4

TO LOWER pH WITH DRY ACID (SODIUM BISULFATE)

GALLONS OF WATER	DROPS OF ACID DEMAND REAGENT ADDED									
	1	2	3	4	5	6	7	8	9	10
100	½ tsp	1¼ tsp	1¾ tsp	2½ tsp	1 TBS	3½ tsp	4¼ tsp	5 tsp	5½ tsp	2 TBS
1000	2 TBS	¼ cup	⅓ cup	½ cup	⅔ cup	¾ cup	¾ cup	1 cup	1 cup	1¼ cup
10000	0.63 lb	1.13 lbs	2.0 lbs	2.5 lbs	3.0 lbs	4.0 lbs	4.5 lbs	5.0 lbs	6.0 lbs	6.25 lbs

TABLE 5

TO RAISE TOTAL ALKALINITY WITH BAKING SODA (SODIUM BICARBONATE)

GALLONS OF WATER	DESIRED INCREASE IN PARTS PER MILLION (ppm)									
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm	60 ppm	70 ppm	80 ppm	90 ppm	100 ppm
100	1½ tsp	1 TBS	1½ TBS	2 TBS	2½ TBS	3 TBS	3½ TBS	¼ cup	⅓ cup	⅓ cup
1000	⅓ cup	½ cup	1 cup	1 cup	1½ cup	1¾ cup	2 cup	2½ cup	2¾ cup	3 cup
10000	1.5 lbs	3.0 lbs	4.5 lbs	6.0 lbs	7.5 lbs	9.0 lbs	10.5 lbs	12.0 lbs	13.5 lbs	15.0 lbs

TABLE 6

TO LOWER TOTAL ALKALINITY WITH MURIATIC ACID (HYDROCHLORIC ACID - 20° Baume')

GALLONS OF WATER	DESIRED DECREASE IN PARTS PER MILLION									
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm	60 ppm	70 ppm	80 ppm	90 ppm	100 ppm
100	1¼ tsp	2½ tsp	1¼ TBS	5 tsp	2 TBS	2½ TBS	3 TBS	3½ TBS	¼ cup	¼ cup
1000	¼ cup	½ cup	¾ cup	1 cup	1⅓ cup	1½ cup	1¾ cup	2 cup	2⅓ cup	2½ cup
10000	1.3 pts	1.3 qts	1.95 qts	2.6 qts	3.25 qts	3.9 qts	1.15 gal	1.3 gal	1.45 gal	1.65 gal

APPENDIX D: cont.

TABLE 7

TO LOWER TOTAL ALKALINITY WITH DRY ACID (SODIUM BISULFATE)

GALLONS OF WATER	DESIRED DECREASE IN PARTS PER MILLION (ppm)									
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm	60 ppm	70 ppm	80 ppm	90 ppm	100 ppm
100	1½ tsp	1 TBS	1½ TBS	2 TBS	2½ TBS	3 TBS	¼ cup	¼ cup	⅓ cup	⅓ cup
1000	⅓ cup	⅔ cup	1 cup	1¼ cup	1⅓ cup	2 cup	2¼ cup	2½ cup	3 cup	3¼ cup
10000	1.6 lbs	3.2 lbs	4.8 lbs	6.4 lbs	8.0 lbs	9.6 lbs	11.2 lbs	12.8 lbs	14.4 lbs	16.0 lbs

TABLE 8

TO RAISE CALCIUM HARDNESS WITH CALCIUM CHLORIDE

GALLONS OF WATER	DESIRED INCREASE IN PARTS PER MILLION (ppm)									
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm	60 ppm	70 ppm	80 ppm	90 ppm	100 ppm
100	1¼ tsp	2½ tsp	1¼ TBS	5 tsp	2 TBS	2½ TBS	3 TBS	3½ TBS	¼ cup	¼ cup
1000	¼ cup	½ cup	¾ cup	1 cup	1⅓ cup	1½ cup	1¾ cup	2 cup	2⅓ cup	2½ cup
10000	1.25 lbs	2.5 lbs	3.75 lbs	5.0 lbs	6.25 lbs	7.5 lbs	8.75 lbs	10.0 lbs	11.3 lbs	12.5 lbs

TABLE 9

SUPER CHLORINATION TABLE FOR ALGAE REMOVAL (30 ppm Shock)

GALLONS OF WATER	% AVAILABLE CHLORINE									
	5%	10%	50%	60%	65%	70%	80%	85%	90%	100%
100	1 cup	½ cup	5 tsp	4 tsp	1 TBS	1 TBS	1 TBS	1 TBS	1 TBS	2 tsp
1000	2½ qts	1¼ qts	½ lb	6½ oz	6 oz	5½ oz	5 oz	4½ oz	4½ oz	4 oz
10000	6 gal	3 gal	5 lbs	4.2 lbs	3.8 lbs	3.6 lbs	3.1 lbs	2.9 lbs	2.8 lbs	2.5 lbs

SOUTHWESTERN DISTRICT
HEALTH UNIT
2216 7th St W
~~2869 3rd Ave. West~~
Dickinson, ND 58601
(701) 483-0171
or toll free
1-800-697-3145

INSTRUCTIONS FOR MONTHLY / DAILY RECORDS:

* The chlorine and pH should be checked at least three (3) times per day. The Total Chlorine should be checked every day at the end of the day to determine if the pool needs to be super-chlorinated. Record the information!

* The total amount of chlorine added to the pool per day should be recorded.

* Any chemicals, acid, soda ash, etc., that are added to the pool should be recorded.

* The number of bathers per day, breakdowns, problems, etc., should be recorded.

* The person responsible for doing the testing should initial the record form when tests are completed.

*KEEP THESE RECORDS DAILY! This is of great benefit to you and the public whose health is in your hands.

* REMEMBER - never add water to acid always add the acid to the water. Never mix chemicals together, always mix chemicals separately then add them to the pool evenly.

* KEEP THE ORIGINAL OF THE MONTHLY OPERATIONAL LOG ON FILE! Remember to include : the month, year, and name of the pool on the log. Keep all records for at least five years.

* If you have any questions, feel free to call our office.

Be sure to fill out this portion:

NAME OF POOL_____

ADDRESS_____

MONTH & YEAR_____

MANAGER & ADDRESS_____

(monthly / daily pool log on reverse side)

DATE	MORNING		MID-DAY		AFTERNOON		End Day	Amt. Chemicals / Day			REMARKS	Initials
	Cl	pH	Cl	pH	Cl	pH	Total Cl	Chlorine	Soda ash	Acid	# of SWIMMERS	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
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