



**Northern Illinois
University**

**Water Quality Management Program
Swimming Pool Operations Procedures**

January 2019

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Appendix A Swimming Facility Daily Operation Report

SWIMMING POOL OPERATIONS PROCEDURE

1.0 Purpose

The Water Quality Management Program (Program) has been developed to document the evaluation procedures and protocols necessary for maintaining water quality at Northern Illinois University (NIU) swimming pool facilities. This Program is intended to ensure compliance with applicable regulations and university policies as noted in section 4.0 as well as applicable, industry guidelines, and/or best management practices in regard to swimming pool water. The following sections outline the standard operating procedures for water quality management and identify the NIU personnel responsible for performing various tasks associated with the Program.

2.0 Scope

The scope of this Program is to ensure applicable regulations, industry guidelines, and/or best management practices are implemented at NIU facilities in regard to swimming pool operations on campus.

3.0 Application

This program applies to the swimming pools located in Anderson Hall and Gabel Hall. This program does not apply to other bodies of water (i.e ponds, lagoons, or temporary pools constructed for research, academic or student related events) that may be used for swimming purposes.

4.0 Regulatory References and University Policies

- Illinois Department of Public Health (IDPH) - 77 Illinois Administrative Code (IAC) Part 820 Swimming Facility Code
- National Science Foundation (NSF) Standard 50
- NIU Facilities Management and Campus Services EH&S Policy
- NIU Health and Safety Policy

5.0 Responsibilities

The following NIU organizations/program areas are responsible for implementation of the Swimming Pool Operations Procedure:

Task	Responsible Organizations/Programs
Program Oversight	Heating Plant
Pool Operations and Maintenance	Heating Plant
Pool Cleaning	Building Services
Data Evaluation, Reporting and Recordkeeping	Heating Plant
Liaison with Regulatory Agencies	Heating Plant

Task	Responsible Organizations/Programs
Program Development, Periodic Review and Program Audit	Environmental Health & Safety

6.0 Permits (77 IAC 820.100)

A construction permit shall be obtained prior to beginning any construction, major alteration or installation of a swimming facility. The permit applicant shall contract with a project designer from the IDPH’s list of prequalified architects or prequalified professional engineers who shall submit a completed application for a construction permit in accordance with 77 IAC 820.100.

The permit applicant shall notify the appropriate IDPH regional office or authorized agent, as specified with the issuance of the permit, when construction, major alteration or installation of the project has been initiated and again when construction, major alteration or installation has been completed. The swimming facility shall not be operated until the IDPH has issued a license to operate. The license applicant must contact the appropriate regional office to make arrangements for an inspection of the swimming facility after making application and ensuring that the swimming facility is in operating condition and in compliance with the regulations.

7.0 Annual License Renewal and Fees (77 IAC 820.105)

It is unlawful to open, establish, maintain or operate a swimming facility within the State of Illinois without first obtaining a license from the IDPH. Applications and fees for the annual renewal of the license shall be made in writing by the holder of the license (Heating Plant), on forms furnished by the IDPH, and shall be accompanied by a license application fee. License renewal fees shall be determined by the total water surface area of the swimming facility. The license fee shall not be refundable and shall contain any change in the information submitted since the original license was issued of the latest renewal granted.

An annual licensing inspection of the swimming facility shall be performed as required by the IDPH to maintain and operate the swimming facility. The findings of the inspection shall be recorded on the inspection report form provided by the IDPH. The initial inspection fee and subsequent annual inspection fee shall be a fixed fee regardless of the water surface area. All fees, unless otherwise established specifically by an agent or ordinance health department, shall be paid in accordance with 77 IAC 820 Appendix B, Tables F, G and H.

8.0 Pool Water Source (77 IAC 820.110 and 820.120)

Water supply for the swimming facility shall be obtained from a community water system in compliance with the IEPA’s rules for Public Water Supplies, a non-community public water supply in compliance with IDPH’s Drinking Water Systems Code, or a semi-private water supply in compliance with IDPH’s Public Area Sanitary Practice Code. Wastewater generated from operating the swimming facility shall discharge to a public sanitary sewer or to a system

that complies with IDPH's Private Sewage Disposal Code. Deck or surface area drainage water may be discharged directly to storm sewers, natural drainage areas, or the ground surface. Drainage shall not result in nuisance conditions that create an offensive odor, produce a stagnant wet area, or create an environment for insect breeding. Wash or backwash water from filters shall be discharged to natural drainage areas, sanitary sewers, storm sewers, or to the ground surface in a manner that does not result in a nuisance condition.

9.0 Sampling Requirements (77 IAC 820)

Swimming pool water quality standards are detailed in *77 Illinois Administrative Code (IAC) Part 820 Swimming Facility Code* as promulgated by the IDPH. Water quality testing is required to be performed on disinfectant residual and pH tests are required to be collected at least twice daily from the shallow and deep areas of the pool. If chlorine is used as a disinfectant, testing for combined chlorine shall be performed at least weekly. If chlorinated cyanurates are used as a chlorine disinfectant, testing for cyanuric acid concentration shall be performed at least weekly. Staff from the Heating Plant shall record water quality testing data in the *Swimming Facility Daily Operation Report* (Appendix A), which will be maintained on file in the Physical Plant work management system for at least three years.

Testing Equipment (820.320(a))

- Water testing equipment for determining pH and disinfectant level shall include at least five color standards with a range of pH 6.8 to 8.0, as a minimum.
- If chlorine is used as a disinfectant, a DPD-type test kit shall include at least four chlorine color standards with a range of 0.5 to 3.0 ppm, as a minimum.
- Pools using chlorinated cyanurates for disinfection shall measure cyanuric acid concentration. The cyanuric acid test kit shall permit readings up to 100 ppm.

Disinfectant Residual (820.320(b))

- If chlorine is used as a disinfectant, the chlorine residual shall be maintained between 1.0 and 4.0 ppm. as free chlorine residual. A free chlorine residual of at least 2.0 ppm shall be maintained when the pool water temperature exceeds 85° F.
- If chlorinated cyanurates are used, the cyanuric acid concentration shall not exceed 100 ppm.
- When combined chlorine in excess of 0.5 ppm. is detected, the pool shall be superchlorinated to attain a free chlorine concentration of at least 10 times the combined chlorine concentration or oxidized by other means to eliminate the combined chlorine.

Water Quality Parameters (820.320(c-f))

- pH: The pH of the pool water shall be maintained between 7.2 and 7.6.
- Turbidity: The pool water shall be sufficiently clear that the entire pool basin is clearly visible from the pool deck.
- Alkalinity: The alkalinity of the pool water shall not be less than 50 ppm nor more than 200 ppm. as calcium carbonate.
- Temperature: The pool water temperature shall not be less than 76° F or more than 92° F. The air temperature shall be higher than the water temperature.
- Bacterial Analysis (Fecal Coliform, E.Coli beta hemolytic Streptococcus or Pseudomonas)

10.0 Swimming Facility Closing (77 IAC 820.330)

Upon discovery of any of the following conditions noted below, Heating Plant staff shall immediately notify the Heating Plant Lead Engineer. The Heating Plant Lead Engineer reserves the right to close the swimming facility upon confirmation of any of the following conditions:

- Conditions at the swimming facility create an immediate danger to health or safety.
- Bacteriological results show any of the following:
 1. Coliform concentration of 10 per 100 ml in two consecutive samples;
 2. Presence of fecal coliform, E coli, beta hemolytic Streptococcus or Pseudomonas in any sample.
- The entire pool basin is not clearly visible from the pool deck.
- A disinfectant residual consisting of a minimum of 0.5 ppm free chlorine or 1.0 ppm bromine is not present or the disinfection system is inoperable.
- The total chlorine concentration exceeds 5 ppm or the total bromine concentration exceeds 10 ppm.
- The Combined chlorine level is less than 0.2 ppm.
- The pH of the swimming facility water is less than 6.8 or greater than 8.0.

- The recirculation pumps or the filters are inoperable.
- A patron has defecated, vomited or lost a significant amount of blood in the swimming facility. When this occurs, the Life Guard on Duty will secure and close the pool by instructing all patrons to evacuate the swimming facility. Once secured, the Life Guard on Duty will contact the Department of Kinesiology. Representatives from the Department of Kinesiology will coordinate with Building Services and Heating Plant to clean and restore the swimming facility back to normal operation. The swimming facility shall remain closed for a minimum of 30 minutes following superchlorination, or longer if necessary, for the disinfectant residual to return to prescribed levels.
- Evidence of food and drink in the swimming facility or any other violation of the Patron Regulations (77 IAC 820.360) that may affect water quality.
- A suction outlet cover is loose, improperly installed, damaged or missing.
- The IDPH issues a written notice to the Heating Plant to close the swimming facility, in which case Heating Plant staff will notify the Kinesiology and Physical Education Staff to post the notice at the entrance to the swimming facility area. The swimming facility shall remain closed until the Heating Plant has received authorization from the IDPH to reopen the swimming facility.

11.0 Operation and Maintenance (77 IAC 820.340)

Swimming Facility (820.340(a))

- The swimming facility shall be maintained free from sediment, lint, dirt and hair. Cracks and other defects in the pool and aquatic features shall be repaired. The walls, ceilings, floors, equipment and swimming facility shall be maintained so that they are protected from deterioration. All equipment shall be maintained in proper condition, with all required components in place. Equipment required to be NSF Standard 50 certified, including filters, skimmers and chemical feeding equipment, shall not be altered or modified in any way.
- Building Services shall rinse swimming facility decks daily and disinfect at least weekly. The walks, overflow gutters, counters, lockers, equipment, furniture, interior partitions and walls shall be kept in good repair, clean, and sanitary. No furniture, plants or other furnishings shall be placed within 4 feet of the swimming facility. This area shall be kept free of obstructions. The deck shall be kept free of tripping hazards, such as deck surface irregularities, hoses, and maintenance equipment. The deck, walkways and floors shall be free of areas with poor drainage that retain water.

Filtration (820.340(k)(4))

The filtration flow rate shall not exceed the maximum filtration design flow rate specified by the filter manufacturer for swimming facility use in accordance with NSF Standard 50. If this rate is not known or has not been determined, the flow rate shall not exceed 15 gallons per minute per square foot of filter area for high-rate sand filters, 3 gallons per minute per square foot for other sand filters, 1.5 gallons per minute per square foot for diatomaceous earth filters, or 0.375 gallons per minute per square foot for cartridge filters. A filtration flow rate of up to 2.0 gallons per minute per square foot may be allowed where continuous feeding of diatomaceous earth is used with a diatomaceous earth filter in accordance with subsection (k)(4)(C)(iii).

- Sand Filters
 1. The filter air release valve shall be opened as necessary, to remove air that collects in the filter, and following each backwash.
 2. The filter shall be backwashed when the design flow rate can no longer be achieved, or when specified by the filter manufacturer, whichever occurs first.
- Positive Displacement Feeders
 1. Positive displacement feeders shall be periodically inspected and serviced. Each pump is inspected no less than twice per day, and can be performed at such times when the pool chemistry is checked.
 2. The service on the pumps is only as-needed for repairs; there is no planned maintenance necessary for these small pumps.
 3. The chlorine pump does require some infrequent spraydown of its pellet basket, which tends to become gloppy as the chlorine briquettes dissolve.
 4. When a chemical feeder is used with calcium hypochlorite solution, to minimize sludge accumulation in the unit, the lowest practicable concentration of solution shall be used, and this concentration shall not exceed 5 percent (about 20 pounds of 65 percent chlorine powder in 50 gallons of water). If liquid chlorine solution is used, the dilution with water is not critical to the operation of the unit. After first thoroughly rinsing with water, a small amount of mild acid solution may be fed through the unit periodically to dissolve sludge accumulations.
- pH Adjustment
 1. Soda ash or caustic soda may be used to raise the swimming facility water pH.

2. Caustic soda shall be used only in accordance with the manufacturer's instructions. Protective equipment and clothing, including rubber gloves and goggles, shall be available for the handling and using of this chemical.
 3. Sodium bisulfate, carbon dioxide gas or muriatic acid shall be used to lower swimming facility water pH. Carbon dioxide cylinders shall be securely chained or otherwise restrained in a manner that will prevent tipping.
 4. Hydrochloric (muriatic) acid shall be used only in accordance with the manufacturer's instructions. Protective equipment and clothing, including rubber gloves and goggles, shall be available for handling and using of this chemical.
 5. The IDPH shall be consulted if unusual pH problems occur, including corrosion or scaling or wide fluctuations in pH.
- Algae Control
 1. Algae shall be eliminated by superchlorinating to 10 ppm and maintaining this level based upon suggested manufacturer of chlorine recommended operating procedures. The swimming facility shall not be open for use during this treatment. If this fails to eliminate the algae, the IDPH shall be consulted for further advice.
 2. Treated algae that clings to the floor and sides of the swimming facility shall be brushed loose and removed by the suction cleaner and filtration system.
- Miscellaneous Chemicals
 1. Chemicals shall be kept covered and stored in the original labeled container, away from flammables and heat and in a clean, dry, well-ventilated place that prevents unauthorized access to the chemicals. All liquid chemical containers shall be stored on containment pallets. Solid (bag) chemicals shall be stored on wooden pallets.
 2. The chemicals used in controlling the quality of water shall be used only in accordance with the manufacturer's instructions.
 3. If polyphosphates are used for sequestering iron, the concentration of polyphosphates shall not exceed 10 ppm.

12.0 Reporting Requirements (77 IAC 820.350)

Operation Reports and Routine Sampling

- Heating Plant staff assigned to service and maintain the swimming facility shall record operational data daily on a report form furnished by the IDPH, or equivalent. Such records shall be kept on file in the Heating Plant on the shared drive, in addition to paper copies, for a minimum of 3 years and/or in accordance with applicable university record retention policies and shall be available for inspection by the IDPH.
- A separate report form shall be completed for each swimming facility.
- Disinfectant residual and pH tests shall be made on samples collected at least twice daily from the shallow and deep areas of each swimming facility, and from all other aquatic features. If chlorine is used as a disinfectant, testing for combined chlorine shall be performed at least weekly. If chlorinated cyanurates are used as a chlorine disinfectant, testing for cyanuric acid concentration shall be performed at least weekly.

APPENDIX A

Swimming Facility Daily Operation Report



SWIMMING FACILITY DAILY OPERATIONAL REPORT

This form must be completed daily and maintained at the facility for at least three years.

Facility Name					City					Month		Year	Name of Pool or Spa				
Day	pH 7.2 to 7.6				Turbidity	Sanitizer	Cl 1 to 4, Br 2 to 8ppm				Flowrate	Filter Backwashed	Temperature	Combined Chlorine PPM	Cyanuric Acid PPM	Completed By Initials	Remarks Include comments relating to equipment failure, closure, injuries, weather, fecal accidents, etc.
	Shallow		Deep		Main Drain Visible?	Shallow		Deep		Required Gallons per Minute _____	76 to 92 pool, 104 max spa						
	a.m.	p.m.	a.m.	p.m.	Yes or No	a.m.	p.m.	a.m.	p.m.		Yes or No	Degrees F					
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The Illinois Department of Public Health is requesting disclosure of information necessary to accomplish the statutory purpose as outlined under Public Act 097-0957. Disclosure of this information is mandatory.

The pool must be closed if: The main drain is not visible from the deck; the chlorine residual is < 0.5 or > 5.0 ppm; the bromine residual is < 1.0 or > 10 ppm; the pH is < 6.8 or > 8.0 when pumps or filters are inoperable; a main drain or suction cover is loose, broken or missing; or another condition exists as described in Section 820.330 of the Swimming Facility Code.