John Bel Edwards
GOVERNOR

Rebekah E. Gee MD, MPH
SECRETARY

State of Louisiana

Louisiana Department of Health
Office of Secretary

November 7, 2017

TO: The Honorable John A. Alario, Jr., President, Louisiana Senate
The Honorable Taylor F. Barras, Speaker of the House of Representatives
The Honorable Fred H. Mills, Jr., Chairman, Senate Health & Welfare Committee
The Honorable Frank A. Hoffmann, Chairman, House Health & Welfare Committee

FR: Rebekah E. Gee, M.D., M.P.H., Secretary

RE: **RULEMAKING – NOTICE OF INTENT**

In accordance with the provisions of the Administrative Procedure Act, (R.S. 49:950, *et seq.*), the state health officer acting through the Department of Health, Office of Public Health (LDH-OPH), proposes to promulgate a rule to amend Part XII (Water Supplies) of Title 51 (Public Health–Sanitary Code) of the Louisiana Administrative Code (LAC). This action is being taken pursuant to the rulemaking authority granted by R.S. 40:4, 40:4.13, and 40:5. The proposed rule is authorized under Act 292 and Act 488 of the Regular Legislative Sessions, 2013 and 2014, respectively. When effective, the proposed amendments to Part XII will assist LDH-OPH in ensuring the continued protection of the public health from contaminated drinking water through enforceable construction, operation and maintenance standards that address the proper design, operation and maintenance of public water systems.

These Louisiana standards were developed and approved by the *Louisiana Standards for Water Works Construction, Operation, and Maintenance Committee* (a.k.a., "water committee") which was initially created by Act 292 of 2013. The *Recommended Standards for Water Works, 2012 Edition* (commonly referred to as the "Ten State Standards") was used as the basis of this proposed rule and the text therein was modified by the water committee to develop a customized state version which, in certain instances, is more applicable to the South's climatic conditions and to Louisiana, in particular. The effective date of the final rule is proposed to be postponed until August 1, 2018 for the permitting of new public water systems or the modification to existing public water systems.

Attached, please find the Notice of Intent and required impact statements, including the summary page of the Fiscal & Economic Impact Statement. The Department plans to publish the notice of intent in the November 20, 2017 issue of the *Louisiana Register*.

RE: **RULEMAKING – NOTICE OF INTENT**

Should you have any questions, please contact Jimmy Guidry, State Health Officer, Louisiana Department of Health, at (225) 342-3417.

JG:AL:CB:cb

Attachments

cc: Jimmy Guidry, M.D., State Health Officer, LDH
Amanda Laughlin, Chief Engineer, Engineering Services Section, OPH
Parham Jabari, M.D., Assistant Secretary, OPH
Avis Richard-Griffin, LDH/OPH Rulemaking Liaison Officer

NOTICE OF INTENT

Department of Health

Office of Public Health

Sanitary Code / Water Supplies

Louisiana Standards for Water Works Construction, Operation and Maintenance

[LAC 51:XII.101, 105, 107, 111-123, 125-163, 165-169, 171-191, 201-209, 211-223, 225-231, 233-255, 257-275, 277-279, 319]

Under the authority of R.S. 40:4, 40:4.13, and 40:5 and in accordance with R.S. 49:950 *et seq.*, the Administrative Procedure Act, notice is hereby given that the state health officer, acting through the Louisiana Department of Health, Office of Public Health (LDH-OPH), intends to amend Part XII (Water Supplies) of the Louisiana State Sanitary Code (LAC 51). When effective, the proposed amendments to Part XII will assist LDH-OPH in ensuring the continued protection of the health of the public from contaminated drinking water through enforceable construction, operation and maintenance standards that address the proper design, operation and maintenance of public water systems.

The proposed rulemaking is authorized under Act 292 and Act 488 of the Regular Legislative Sessions, 2013 and 2014, respectively. These Louisiana standards were developed and approved by the *Louisiana Standards for Water Works Construction, Operation, and Maintenance Committee* (a.k.a., "water committee") which was initially created by Act 292 of 2013. The *Recommended Standards for Water Works, 2012 Edition* (commonly referred to as the "Ten State Standards" and published by the Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers) was used as the basis of this proposed rule and the text therein was modified by the water committee to develop a customized state version which, in certain instances, is more applicable to the South's climatic conditions and to Louisiana, in particular. The effective date of the final rule is proposed to be postponed until August 1, 2018 for the permitting of new public water systems or the modification to existing public water systems. The bulk of the proposed Louisiana standards are contained in the following listed Subchapters (with the general subject matter listed in the same order as in the Ten State Standards).

Chapter 1. General

- Subchapter A. Submission of Plans §§111-123;
- Subchapter B. General Design §§125-163;
- Subchapter C. Source Development §§165-169;
- Subchapter D. Treatment §§171-191;

Chapter 2. Public Water System Construction, Operation and Maintenance

- Subchapter A. Chemical Application §§201-209;
- Subchapter B. Pumping Facilities §§211-223;
- Subchapter C. Finished Water Storage §§225-231;

Subchapter D. Distribution System Piping and Appurtenances §§233-255; and

Subchapter F. Waste Residuals §§257-275.

For these reasons set forth above, Part XII (Water Supplies) of the Louisiana State Sanitary Code (LAC 51:XII) is proposed to be amended as follows:

Title 51

PUBLIC HEALTH—SANITARY CODE

Part XII. Water Supplies

Chapter 1. General

§101. Definitions
[formerly paragraph 12:001]

A. Unless otherwise specifically provided herein, the following words and terms used in this Part of the Sanitary Code, and all other Parts which are adopted or may be adopted, are defined for the purposes thereof as follows.

* * *

Average Daily Demand During the Month of Maximum Water Use -- the largest volume of flow anticipated to occur during a calendar month, expressed as a daily average.

* * *

Ten State Standards— Repealed.

* * *

AUTHORITY NOTE: The first source of authority for promulgation of the Sanitary Code is in R.S. 36:258(B), with more particular provisions found in Chapters 1 and 4 of Title 40 of the Louisiana Revised Statutes. This Part is promulgated in accordance with R.S. 36:254 (B)(7), R.S. 40:4.A.(8), R.S. 40:4.13.D.(1)(2) , R.S. 40:5.A. (2)(3)(5)(6)(17)(20), and R.S. 40:1148.

HISTORICAL NOTE: Promulgated by the Department of Health and Hospitals, Office of Public Health, LR 28:1318 (June 2002), amended LR 28:2513 (December 2002), LR 30:1194 (June 2004), LR 30:2326 (October 2004), LR 35:484 (March 2009), LR 35:1240 (July 2009), LR 38:2375 (September 2012), LR 38:2793 (November 2012), LR 38:3232 (December 2012), amended by the Department of Health, Office of Public Health, LR 43:84 (January 2017), LR44:

§103. ...

§105. Permit Requirements for a Potable Water Supply
[formerly paragraph 12:002-2]

A. No public water supply shall be ~~hereafter~~ constructed, operated or modified to the extent that the capacity, hydraulic conditions, functioning of treatment processes, or the quality of finished water is affected, without, and except in accordance with, a permit from the state health officer.

B. ...

C. ~~Detailed plans and specifications for the installation for which a permit is requested shall be submitted by the person having responsible charge of a municipally owned public water supply or by the owner of a privately owned public water supply.~~Submission of plans for maintenance and replacement of existing facilities in-kind shall not be required.

D. ~~Public water systems shall be designed, installed, and maintained in accordance with the "Ten-State Standards" and the *Louisiana Water Well Rules, Regulations, and Standards*, plus any additional requirements of the state health officer as set forth in this Part. Exception: In regards to the application/enforcement of the "Ten-State Standards", the following Sections thereof shall be applied/enforced as follows:~~

~~1. sections 2.6, 3.2.1.2, 3.2.1.3.a, and 6.6.6 shall not be mandatory for non-community water supplies (unless the non-community water supply serves a hospital);~~

~~2. the water sight glass required under Section 7.2.4 shall not be mandatory if an automated control to maintain the proper water-to-air ratio in the tank is provided.~~Detailed plans and specifications for the installation for which a permit is requested shall be submitted by the Engineer of Record or the person having responsible charge of a municipally owned public water supply or by the owner of a privately owned public water supply.

E. Effective August 1, 2018, the provisions set forth under LAC 51:XII §§111-191 and 201-277, together with any additional requirements of the state health officer as set forth in this Part, shall be used as the basis of the design of any new public water system or any proposed new construction or modification to an existing public water system. After a permit by the state health officer has been issued, such system/modification shall be constructed, installed and maintained in accordance with said permit.

F. Permits required by this Section and any related letters issued by the state health officer or copy of letters issued to the state health officer concerning the review of related plans and specifications, as well as the related approved plans and specifications themselves, shall be permanently retained by the owner of the public water system including any subsequent or successor owner.

AUTHORITY NOTE: Promulgated in accordance with R.S. 40:4 (A)(8), 40:4.13.D.(1)(2) and R.S. 40:5.A.(2)(3)(5)(6)(7)(17)(19).

HISTORICAL NOTE: Promulgated by the Department of Health and Hospitals, Office of Public Health, LR 28:1320 (June 2002), amended LR 38:2376 (September 2012~~). ~~), amended by the Department of Health, Office of Public Health, LR 44:

§107. Provision for Grandfather Systems [formerly paragraph 12-002-3]

A. Permits issued~~,~~ and approvals of plans and specifications granted by the state health officer prior to ~~the effective date of this Code~~ August 1, 2018 shall remain ~~in effect~~valid as they pertain to the design of the public water supply, unless the revision of such is determined necessary by the state health officer.

B. Notwithstanding §107.A, every public water system shall undertake corrective action in accordance with §319.B and C of this Part regarding any significant deficiencies, as defined in §319.D of this Part, identified on a sanitary survey conducted by the state health officer.

C. The owner shall have the burden of proving that a public water system, and any modifications thereto or component parts thereof, was permitted by and conforms to plans and specifications approved by the state health officer.

AUTHORITY NOTE: Promulgated in accordance with R.S. 40:4 (A)(8), 40:4.13D.(1)(2) and R.S. 40:5.A.(2)(3)(5)(6)(7)(17)(19).

HISTORICAL NOTE: Promulgated by the Department of Health and Hospitals, Office of Public Health, LR 28:1320 (June 2002)~~.~~, amended by the Department of Health, Office of Public Health, LR 44:

Subchapter A. Submission of Plans

§111. General Requirements

A. All reports, final plans, specifications, and design criteria required by §105 of this Part shall be submitted at least 60 days prior to the date on which action by the state health officer is desired. Environmental assessments, and permits for construction, to take water, for waste discharges, for stream crossings, etc., may be required from other federal, state, or local agencies.

B. No approval for construction can be issued until final, complete, detailed plans and specifications have been submitted to the state health officer and found to be satisfactory.

C. Documents submitted for formal approval shall include but not be limited to:

1. engineer's report, where applicable;

2. summary of the design criteria;

3. operation requirements, where applicable;

4. general layout;

5. detailed plans;

6. specifications;

7. cost estimates;

8. documentation of adequate source of supply (e.g., water purchase contracts between water supplies, and/or inter-municipal agreements), where applicable;

9. evaluation of technical, managerial, and financial capacity where applicable;

a. Public water systems are required by the Louisiana Department of Health, Office of Public Health (LDH-OPH) to demonstrate adequate capacity development under LAC 48:V. Subchapter B.

b. Except as may otherwise be required under LAC 48:V.77.Subchapter B., the evaluation for existing public water systems shall include:

i. a discussion of the system's current technical capacity along with any project related changes with respect to operator certification requirements and the operator's ability to implement any system changes that may be required upon project completion;

ii. a discussion of the system's current overall management and how the system's management will be impacted by the project including but not limited to whether the system has an asset management plan and, if so, how the project components will be incorporated into that plan;

iii. a discussion of the water system's overall financial capacity along with user projected water rates including the system's outstanding obligations combined with the anticipated debt from the current project under review and the overall operation and maintenance. If applicable, the financial capacity discussion should include details of any energy efficiency

components included as part of the project along with the estimated long term cost and energy savings associated with them; and

iv. other additional information as required by the state health officer.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§113. Engineer's Report

A. The engineer's report for water supply system improvements shall, where applicable, present the following information.

1. General information, including:

a. description of the existing water works and sewerage facilities;

b. identification of the municipality or area served;

c. name and mailing address of the owner or official custodian; and

d. imprint of professional engineer's seal or conformance with engineering registration requirements of the Louisiana Professional Engineering and Land Surveying Board.

2. Extent of water supply system, including:

a. description of the nature and extent of the area to be served;

b. provisions for extending the water supply system to include additional areas;

c. appraisal of the future requirements for service, including existing and potential industrial, commercial, institutional, and other water supply needs.

3. Justification of the Project. Where two or more solutions exist for providing public water system facilities, each of which is feasible and practicable, discuss the alternatives. Give reasons for selecting the one recommended, including financial considerations, operational requirements, operator qualifications, reliability, and water quality considerations.

4. Soil, groundwater conditions, and foundation problems, including a description of:

a. the character of the soil through which water mains are to be laid;

b. foundation conditions prevailing at sites of proposed structures;

c. the approximate elevation of ground water in relation to subsurface structures.

5. Water use data, including:

a. a description of the population trends as indicated by available records, and the estimated population which will be served by the proposed water supply system or expanded system 20 years in the future in 5 year intervals or over the useful life of critical structures and/or equipment;

b. present water consumption and the projected average and maximum daily demands, including fire flow demand (Subchapter C);

c. present and/or estimated yield of the sources of supply;

d. unusual occurrences;

e. current percent of unaccounted water for the system and the estimated reduction of unaccounted for water after project completion if applicable, i.e., project is to replace aged water mains, leaking storage, or other improvements that will result in reduced water loss.

6. Flow requirements, including:

a. hydraulic analyses based on flow demands and pressure requirements (see §237.A)

b. fire flows, when fire protection is provided, meeting the recommendations of the Insurance Services Office or other similar agency for the service area involved.

7. Description of the proposed source or sources of water supply to be developed, the reasons for their selection, and provide information as follows:

a. Surface water sources, including:

i. hydrological data, stream flow and weather records;

ii. safe yield, including all factors that may affect it;

iii. maximum flood flow, together with approval for safety features of the spillway and dam from the appropriate state health officer;

iv. description of the watershed, noting any existing or potential sources of contamination (such as highways, railroads, chemical facilities, land/water use activities, etc.) which may affect water quality;

v. summarized quality of the raw water with special reference to fluctuations in quality, changing meteorological conditions, etc.

vi. source water protection issues or measures, including erosion and siltation control structures that need to be considered or implemented.

b. Groundwater sources, including:

i. sites considered;

ii. advantages of the site selected;

iii. elevations with respect to surroundings;

iv. probable character of formations through which the source is to be developed;

v. geologic conditions affecting the site, such as anticipated interference between proposed and existing wells;

vi. summary of source exploration, test well depth, and method of construction; placement of liners or screen; test pumping rates and their duration; water levels and specific yield; water quality;

viii. sources of possible contamination such as sewers and sewage treatment/disposal facilities, highways, railroads, landfills, outcroppings of consolidated water-bearing formations, chemical facilities, waste disposal wells, agricultural uses, etc.;

ix. wellhead protection measures being considered (see §169).

8. Proposed treatment processes, including:

a. a summary establishing the adequacy of proposed processes and unit parameters for the treatment of the specific water under consideration. Bench scale test, pilot studies, or demonstrations may be required to establish adequacy for some water quality standards.

b. Alternative methods of water treatment and chemical use should be considered as a means of reducing waste handling and disposal problems.

9. Sewerage System Available. Describe the existing sewerage system and sewage treatment works, with special reference to their relationship to existing or proposed water supply system structures which may affect the operation of the water supply system, or which may affect the quality of the supply.

10. Waste disposal, including:

a. Discuss the various wastes from the water treatment plant, their volume, proposed treatment and points of discharge.

b. If discharging to a sanitary sewerage system, verify that the system, including any lift stations, is capable of handling the flow to the sewage treatment works and that the treatment works is capable and will accept the additional loading.

11. Automation, including:

a. supporting data justifying automatic equipment, including the servicing and operator training to be provided.

b. Manual override must be provided for any automatic controls.

c. Highly sophisticated automation may put proper maintenance beyond the capability of the plant operator, leading to equipment breakdowns or expensive servicing. Adequate funding shall be assured for maintenance of automatic equipment.

12. Project sites, including:

a. discussion of the various sites considered and advantages of the recommended ones;

b. the proximity of residences, industries, and other establishments;

c. any potential sources of pollution that may influence the quality of the supply or interfere with effective operation of the water supply system, such as sewage absorption systems, septic tanks, privies, cesspools, sink holes, sanitary landfills, refuse and garbage dumps, etc.

13. Financing, including:

a. estimated cost of integral parts of the system, broken down by dollar amount or percentages for source development, storage, distribution mains, pumping, transmission mains, treatment, and planning (including all soft costs);

b. detailed estimated annual cost of operation;

c. proposed methods to finance both capital charges and operating expenses.

d. Summarize planning for future needs and services.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§115. Plans

A. Plans for water supply system improvements shall, where applicable, provide the following:

1. General layout, including:

a. suitable title;

b. name of municipality, or other entity or person responsible for the water supply;

c. area or institution to be served;

d. scale;

e. north point;

f. datum used;

g. boundaries of the municipality or area to be served;

h. seal, signature and date of the Louisiana licensed professional engineer or in conformance with engineering registration requirements of the Louisiana Professional Engineering and Land Surveying Board;

i. imprint of professional engineer's seal or in conformance with engineering registration requirements of the Louisiana Professional Engineering and Land Surveying Board;

j. legible prints suitable for reproduction;

k. location and size of existing water mains;

l. location and nature of existing water supply structures and appurtenances affecting the proposed improvements, noted on one sheet, if possible.

2. Detailed plans, including:

a. stream crossings, providing profiles with elevations of the stream bed and the normal and extreme high and low water levels except where submarine crossings are to be installed by means of directional drilling then the extreme high water level may be omitted;

b. profiles having a horizontal scale of not more than 100 feet to the inch and a vertical scale of not more than 10 feet to the inch, with both scales clearly indicated;

c. location and size of the property to be used for the groundwater development with respect to known references such as roads, streams, section lines, or streets;

d. topography and arrangement of present or planned wells or structures, with contour intervals not greater than two feet;

e. elevations of the highest known flood level, floor of the structure, upper terminal of protective casings and outside surrounding grade, using United States Coast and Geodetic Survey, United States Geological Survey or equivalent elevations where applicable as reference;

f. plat and profile drawings of well construction, showing diameter and depth of drill holes, casing and liner diameters and depths, grouting depths, elevations and other details to

describe the proposed well completely. Upon completion submit record drawings reflecting geologic formations and water levels;

g. location of all existing and potential sources of pollution which may affect the water source or, underground treated water storage facilities;

h. size, length, and materials of proposed water mains;

i. location of existing or proposed streets; water sources, ponds, lakes, and drains; storm, sanitary, combined and house sewers; septic tanks, disposal fields and cesspools;

j. schematic flow diagrams and hydraulic profiles showing the flow through various plant units;

k. piping in sufficient detail to show flow through the plant, including waste lines;

l. locations of all chemical storage areas, feeding equipment and points of chemical application (see Subchapter B of Chapter 2 of this Part);

m. all appurtenances, specific structures, equipment, water treatment plant waste disposal units and points of discharge having any relationship to the plans for water mains and/or water supply structures;

n. locations of sanitary or other facilities, such as lavatories, showers, toilets, and lockers, when applicable or required by the state health officer;

o. locations, dimensions, and elevations of all proposed plant facilities;

p. locations of all sampling taps;

q. adequate description of any features not otherwise covered by the specifications.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§117. Specifications

A. Complete, detailed technical specifications for those applicable sanitary components shall be supplied for the proposed project, including:

1. a program for keeping existing water supply facilities in operation during construction of additional facilities so as to minimize interruption of service;

2. laboratory facilities and equipment, including the capacity to perform laboratory analyses of required tests;

3. the number and design of chemical feeding equipment (see §201 and §203);

4. procedures for flushing, disinfection and testing, as needed, prior to placing the project in service;

5. materials or proprietary equipment for sanitary or other facilities including any necessary backflow or back-siphonage protection.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§119. Design Criteria

A. A summary of complete design criteria for those applicable sanitary components shall be submitted for the proposed project.

B. The summary shall contain but shall not be limited to the following:

1. long-term dependable yield of the source of supply;
2. reservoir surface area, volume, and a volume-versus-depth curve, if applicable;
3. area of watershed, if applicable;
4. estimated average and maximum day water demands for the design period;
5. number of proposed services;
6. fire fighting requirements;
7. flash mix, flocculation and settling basin capacities;
8. retention times;
9. unit loadings;
10. filter area and the proposed filtration rate;
11. backwash rate;
12. chemical feeder capacities and ranges;
13. minimum and maximum chemical application rates.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§121. Revisions to Approved Plans

A. Any substantial deviations from approved plans or specifications must be approved by the state health officer before such changes are made.

B. Substantial deviations include, but are not limited to deviations in:

1. capacity;
2. hydraulic conditions; and
3. operating units; the functioning of water treatment processes, or the quality of water to be delivered.

C. Revised plans or specifications should be submitted in time to permit the review and approval of such plans or specifications before any construction work, which will be affected by such changes, is begun.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§123. Additional Information Required

A. The state health officer may require additional information which is not part of the construction drawings, such as head loss calculations, proprietary technical data, copies of deeds, copies of contracts, etc.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

Subchapter B. General Design

§125. Design Basis

A. The system including the water source and treatment facilities shall be designed for average daily flow of the maximum month.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§127. Plant Layout

A. Plant layout, at a minimum, shall consider the following:

1. functional aspects of the plant layout;
2. provisions for future plant expansion;
3. provisions for expansion of the plant waste treatment and disposal facilities;
4. access roads;
5. site grading;
6. site drainage;
7. walks;
8. driveways; and
9. chemical delivery.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§129. Building Layout

A. Building layout shall be designed to provide for:

1. adequate ventilation;
2. adequate lighting;
3. adequate heating;
4. adequate drainage;
5. dehumidification equipment, if necessary;

6. accessibility of equipment for operation, servicing, and removal;

7. flexibility of operation;

8. operator safety;

9. convenience of operation; and

10. if rooms are used chemical storage and feed equipment in a separate room to reduce hazards and dust problems.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§131. Location of Structures

A. The appropriate regulating authority must be consulted regarding any structure which is so located that normal or flood stream flows may be impeded.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§133. Electrical and Controls

A. Electrical equipment, electrical instrumentation and controls shall be located above grade, in areas not subject to flooding or protected from damage due to water inundation.

B. The design of all electrical work for new facilities or modifications to existing facilities shall conform to the applicable requirements of the State Uniform Construction Code, LAC 17:I and any other local code(s) which may have stricter requirements.

C. Existing electrical and controls at facilities may remain provided they do not create an unsafe condition and do not reduce the reliability of the equipment or cause failure to system components.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§135. Standby Power

A. Dedicated standby power shall be provided by any community water supply and any non-community water supply serving a hospital so that water can be treated and/or pumped to the distribution system during power outages to meet the average daily demand during the month of maximum water use.

B. Carbon monoxide detectors should be installed where fuel-fired generators are housed.

C. Alternatives to dedicated standby power may be considered by the state health officer with proper justification.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§137. Laboratory Facilities

A. Each public water system shall have equipment and facilities or contracted services for the routine daily laboratory testing necessary to ensure the proper operation of the water supply system.

B. Laboratory equipment selection shall be based on:

1. the characteristics of the raw water source;

2. the complexity of the treatment process involved;

3. the contaminants or analytes for which monitoring is required or desired; and

4. the particular laboratory methodology and minimum accuracy to be performed for such contaminants or analytes.

C. Laboratory test kits which simplify procedures for making one or more tests may be acceptable.

D. An operator or chemist qualified to perform the necessary laboratory tests shall be required.

E. Other than those analytes allowed to be analyzed in a LDH-OPH Approved Chemical Laboratory/Drinking Water (see Chapter 15 of this Part), analyses conducted to determine compliance with drinking water regulations shall be performed in a LDH-OPH certified or a U. S. Environmental Protection Agency (EPA) certified laboratory in accordance with the requirements of this Part.

F. Persons designing and equipping laboratory facilities shall confer with the state health officer before beginning the preparation of plans or the purchase of equipment. Methods for verifying adequate quality assurances and for routine calibration of equipment shall be provided.

G. Testing Equipment. As a minimum, the following laboratory equipment shall be provided:

1. Surface water systems or groundwater under the direct influence of surface water (GWUDISW) systems shall have a nephelometric turbidimeter meeting the requirements of the approved turbidity methods in Chapter 11 of this Part.

2. Each surface water treatment plant or GWUDISW plant utilizing flocculation and sedimentation, including those which lime soften, shall have a pH meter, jar test equipment, and titration equipment for both hardness and alkalinity.

3. Each ion-exchange softening plant, and lime softening plant treating only groundwater shall have a pH meter and titration equipment for both hardness and alkalinity.

4. Each iron and/or manganese removal plant shall have test equipment capable of accurately measuring iron to a minimum of 0.1 milligrams per liter, and/or test equipment capable of accurately measuring manganese to a minimum of 0.05 milligrams per liter.

5. Public water systems which chlorinate shall have test equipment for determining both free and total chlorine residual by the applicable methods listed in Table 1 of §1105.C of this Part.

6. If a public water system adjusts its fluoride level, equipment shall be provided for measuring the quantity of fluoride in the water. Such equipment shall be subject to the approval of the state health officer.

7. Public water systems which feed poly and/or orthophosphates shall have test equipment capable of accurately measuring phosphates from 0.1 to 20 milligrams per liter or to 0.1 to 1.2 times the target dose whichever is less.

8. Public water systems that use chlorine dioxide shall have test equipment for determining both chlorine dioxide and chlorite residual by the applicable methods listed in §1301 of this Part.

9. Surface water systems, GWUDISW systems, and any groundwater system required to or choosing to achieve a minimum CT value [residual disinfectant concentration ("C") times the contact time ("T") when the pipe, vessel, etc., is in operation] at or before the first customer shall have a method of measuring water temperature using a thermometer or thermocouple with a minimum accuracy of plus or minus 0.5 degrees Celsius (0.5°C).

H. Physical Facilities. Where laboratory facilities are provided each public water system shall provide:

1. sufficient bench space,

2. adequate ventilation,

3. adequate lighting,

4. storage room,

5. laboratory sink, and

6. auxiliary facilities (e.g., restroom facilities available on-site of the in-house lab for the operator, analyst, or chemist running the lab tests; special fire-proof cabinets for storing volatile reagents as may be required by the state fire marshal; special ventilation hoods as may be required by OSHA over the work area; refrigerator; Bunsen burner, stirrers; etc.).

7. Air conditioning may be deemed necessary.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§139. Monitoring Equipment

A. Water treatment plants shall be provided with equipment (including recorders, where applicable) to monitor the water as follows:

1. Plants treating ground water using iron removal and/or ion exchange softening shall have the capability to monitor and record free chlorine residual.

2. Ion exchange plants for nitrate removal shall continuously monitor and record the treated water nitrate level.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§141. Sample Taps

A. Sampling facilities shall be provided so that water samples can be obtained from each water source and from appropriate locations in each unit operation of treatment, and from the finished water.

B. Taps shall be consistent with sampling needs and shall not be of the petcock type.

C. Taps used for obtaining samples for bacteriological analysis:

1. shall be: of the smooth-nosed type without interior or exterior threads:

2. shall not be of the mixing type; and

3. shall not have a screen, aerator, or other such appurtenance.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§143. Facility Water Supply

A. The water treatment plant's service connection line and the finished water sample tap line shall both be supplied from a source of finished water at a point where all chemicals have been thoroughly mixed, and the required disinfectant contact time has been achieved (see §179.C).

B. In some cases the take off point of the water treatment plant's own service connection line and the finished water sample tap line may be downstream of the plant itself but at or before the first customer.

C. There shall be no cross-connections between the water treatment plant's service connection line or the finished water sample tap line and any piping, troughs, tanks, or other treatment units containing wastewater, treatment chemicals, raw or partially treated water.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§145. Wall Castings

A. Consideration shall be given to providing extra wall castings built into the structure to facilitate future uses whenever pipes pass through walls of concrete structures.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§147. Meters

A. All public water systems shall have an acceptable means of measuring the flow from: each source, the washwater, the recycled water and any blended water of different quality, and the finished water.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§149. Piping Color Code

A. Except for those systems that comply with Louisiana Revised Statute 40:4.12, a water supply system shall utilize the color scheme provided in Table 149.B below to facilitate the identification of above ground piping in treatment plants and pumping stations.

Table 149.B Piping Color Code	
Water Lines	
Raw or Recycle	Olive Green
Settled or Clarified	Aqua
Finished or Potable	Dark Blue
Chemical Lines	
Alum or Primary Coagulent	Orange
Ammonia	White
Carbon Slurry	Black
Caustic	Yellow with Green Band
Chlorine (Gas or Solution)	Yellow
Chlorine Dioxide	Yellow with Violet Band
Fluoride	Light Blue with Red Band
Lime Slurry	Light Green
Ozone	Yellow with Orange Band
Phosphate Compounds	Light Green with Red Band
Polymers or Coagulant Aids	Orange with Green Band
Potassium Permanganate	Violet
Soda Ash	Light Green with Orange Band
Sulfuric Acid	Yellow with Red Band
Sulfur Dioxide	Light Green with Yellow Band
Waste Lines	
Backwash Waste	Light Brown
Sludge	Dark Brown
Sewer (Sanitary or Other)	Dark Gray
Other	
Compressed Air	Dark Green
Gas	Red
Reclaimed Water	Purple
Other liquids	Light Gray with a label

B. Any nonpotable water lines considered as plumbing (e.g., piping and outlets conveying nonpotable water within an office building, restroom, or other structure normally served by finished, potable water) and located on the water supply system's property is required to be identified in accordance with the State Uniform Construction Code, LAC 17:I.

C. In lieu of the color coding of pipes as described above, all pipes may be painted similar colors as long as each and every pipe is banded and labeled at 5 foot intervals with the name of the liquid or gas clearly displayed on the pipe. Arrows indicating the direction of flow should be included in this labeling or utilize other methods approved by the state health officer.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§151. Disinfection

A. Water from new systems, or from any new part(s) of existing systems shall not be furnished for consumer's use until all wells, pipes, tanks, and equipment which can convey or store potable water are disinfected in accordance with AWWA procedures as required in §§169, 225, and 245 of this Part.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§153. Operation and Maintenance Manual

A. An operation and maintenance manual shall be supplied to the water supply system as part of any proprietary unit installed in the facility.

B. The manual shall provide:

1. a parts list;

2. a parts order form,

3. operator safety procedures; and

4. an operational trouble-shooting section.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§155. Operator Instruction

A. Provisions shall be made for operator instruction at the start-up of a plant or pumping station.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§157. Safety

A. Consideration shall be given to the safety of water plant personnel and visitors.

B. The design shall comply with all applicable safety codes and regulations that include, but are not limited to, the codes adopted under the authority of Act 12 of the 2005 First Extraordinary Session, State Fire Marshal regulations (see LAC 55:V), National Fire Protection Association (NFPA) standards, and state and federal Occupational Health and Safety Administration (OSHA) standards.

C. Items to be considered include, but are not limited to, noise arresters, noise protection, confined space entry, protective equipment and clothing, gas masks, safety showers and eye washes, handrails and guards, warning signs, smoke detectors, toxic gas detectors and fire extinguishers.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§159. Security

A. Security measures including but not limited to the requirements of §§315.A and 327.A.13 of this Part, shall be installed and instituted.

B. Design measures to help ensure the security of water system facilities shall be incorporated and, as a minimum, shall include a means to lock all exterior doorways, windows, gates and other entrances to source, production, treatment, pumping and water storage facilities.

C. Other measures may include signage, closed circuit monitoring, real-time water quality monitoring, and intrusion alarms, as well as safety measures to prevent tampering with any electronic, computer or other automated system which may operate or assist in the operation of the water supply system.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§161. Flood Protection

A. Other than surface water intakes, all critical water supply facilities shall be protected to at least the 100-year flood elevation.

B. The water supply system shall provide high water vehicles, boats, or other acceptable means and methods to be able to access, safely operate, and maintain its critical water supply facilities during floods or other high water events.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§163. Design; Other Considerations

A. Consideration shall be given to the design requirements of other federal, state, and local regulatory agencies for items including, but not limited to:

1. energy efficiency;
2. water conservation;
3. environmental impact;
4. safety requirements;
5. special designs for the handicapped;
6. plumbing and electrical codes; and
7. construction in the flood plain.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

Subchapter C. Source Development

§165. General Requirements

A. In selecting the source of water supply to be developed, the designing engineer shall prove to the satisfaction of the state health officer and other applicable reviewing authorities that an acceptable source having an adequate quantity of water will be available, and that the water which is to be delivered to the consumers shall be adequately treated, when necessary or required, to meet the current requirements of the state health officer with respect to microbiological, physical, chemical and radiological qualities.

B. Each water supply system should take its raw water from the best available source which is economically reasonable and technically possible.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§167. Surface Water

A. A source water protection plan enacted for continued protection of the watershed from potential sources of contamination shall be provided as determined by the state health officer. Surface water includes sources of water supply such as, but not limited to:

1. all streams;
2. tributary streams;
3. drainage basins,
4. natural and man-made ponds and lakes; and
5. artificial reservoirs or impoundments.

B. Surface Water Quantity. The quantity of water at the source shall be adequate to meet the maximum projected water demand of the service area as shown by calculations based on a 1 in 50 year drought or the extreme drought of record, and should include consideration of multiple year droughts. Requirements for minimum flows downstream of the intake shall:

1. comply with requirements of the appropriate reviewing authority/authorities;
2. provide a reasonable surplus for anticipated growth;
3. be adequate to compensate for all losses such as silting, evaporation, seepage, etc; and
4. be adequate to provide ample water for other legal users of the source.

C. Surface Water Quality. A study shall be made of the factors, both natural and man-made, which may affect water quality in the water supply stream, river, lake or reservoir and shall include, but not be limited to:

1. determining possible future uses of impoundments or reservoirs;
2. determining degree of control of watershed by owner;
3. assessing degree of hazard to the supply posed by agricultural, domestic, industrial, or recreational activities in the watershed, which may generate toxic or harmful substances detrimental to treatment processes;

4. assessing all waste discharges (point source and non-point sources) and activities that could impact the water supply. The location of each waste discharge shall be shown on a scale map;

5. obtaining samples over a sufficient period of time to assess the microbiological, physical, chemical and radiological characteristics of the water;

6. assessing the capability of the proposed treatment process to reduce contaminants to applicable standards; and

7. consideration of currents, wind and ice conditions, salt water wedges/intrusion and the effect of confluencing streams.

D. Structures. Structures shall be designed in accordance with the following requirements.

1. The design of intake structures shall provide for:

a. withdrawal of water from more than one level if quality varies with depth, as determined by the state health officer;

b. separate facilities for release of less desirable water held in storage;

c. inspection of manholes every 1000 feet for pipe sizes large enough to permit visual inspection;

d. occasional cleaning of the inlet line;

e. adequate protection against rupture by dragging anchors, ice, etc;

f. ports located above the bottom of the stream, lake or impoundment, but at sufficient depth to be kept submerged at low water levels;

g. where shore wells are not provided, a diversion device capable of keeping large quantities of fish or debris from entering an intake structure; and

h. when buried surface water collectors are used, sufficient intake opening area must be provided to minimize inlet headloss. Particular attention should be given to the selection of backfill material in relation to the collector pipe slot size and gradation of the native material over the collector system.

2. Raw water pumping wells shall:

a. have motors and electrical controls located above grade, and protected from flooding as required by the state health officer;

b. be accessible;

c. be designed against flotation;

d. be equipped with removable or traveling screens before the pump suction well;

e. provide for introduction of chlorine or other chemicals in the raw water transmission main if necessary for quality control;

f. have intake valves and provisions for backflushing or cleaning by a mechanical device and testing for leaks, where practical;

g. have provisions for withstanding surges where necessary; and

h. be constructed in a manner to prevent intrusion of contaminants.

3. Off Stream Raw Water Storage Reservoirs. An off-stream raw water storage reservoir is a facility into which water is pumped during periods of good quality and high stream flow for future release to treatment facilities. The off-stream raw water storage reservoirs shall be constructed to assure that:

a. water quality is protected by controlling runoff into the reservoir;

b. dikes are structurally sound and protected against wave action and erosion;

c. intake structures and devices meet requirements of §167.D.1;

d. point of influent flow is separated from the point of withdrawal;

e. separate pipes are provided for influent to and effluent from the reservoir; and

f. a bypass line is provided around the reservoir to allow direct pumping to the treatment facilities.

E. Nuisance Plant or Animal. If it is determined that chemical treatment is warranted for the control of nuisance plants or animals treatment shall be in accordance with Subchapter D of Chapter 1 of this Part and shall be acceptable to the state commissioner of agriculture and the state health officer. In addition, the following requirements shall be met.

1. Chemical treatment shall be in accordance with the manufacturer's label and application instructions, the Louisiana Pesticide Law (R.S. 3:3201, et seq.) and its implementing rules and regulations [see LAC Title 7 (Agriculture and Animals), Part XXIII (Pesticides) including, but not limited to, Chapter 31 (Water Protection)], LAC Title 51 (Public Health—Sanitary Code) Part XII (Water Supplies).

2. Chemical treatment shall be performed in such a manner as to prevent a USEPA (or state-equivalent) maximum contaminant level of a primary drinking water contaminant to be exceeded in finished drinking water.

3. Any analyses of finished drinking water to confirm whether or not a USEPA (or state-equivalent) maximum contaminant level of a primary drinking water contaminant has been exceeded shall only be acceptable if the water sample is collected, transported and stored in accordance with USEPA-approved methods [see 40 CFR Part 136.3, Table II] and then analyzed by a LDH - Certified Chemical Laboratory/Drinking Water.

4. In all cases involving a pesticide application for nuisance plant or animal control, when the water being treated is a source of water supply, the final determination of the safety of finished drinking water shall be made exclusively by the state health officer

a. Facility safety items, including but not limited to ventilation, operator protective equipment, eyewashes/showers, cross connection control, etc. shall be provided;

b. Solution piping and diffusers shall be installed within the intake pipe or in a suitable carrier pipe.

c. Provisions shall be made to prevent dispersal of chemical into the water environment outside the intake. Diffusers shall be located and designed to protect all intake structure components;

d. A spare solution line should be installed to provide redundancy and to facilitate the use of alternate chemicals;

e. The chemical feeder shall be interlocked with plant system controls to shut down automatically when the raw water flow stops;

f. when alternative control methods are proposed for nuisance plant and animal control, appropriate piloting or demonstration studies, satisfactory to the state health officer, may be required.

F. Impoundments and Reservoirs. Site preparation of impoundments and reservoirs shall provide where applicable:

1. removal of brush and trees to high water elevation;

2. protection from floods during construction;

3. abandonment of all wells which will be inundated, in accordance with requirements of the Department of Natural Resources, Office of Conservation, and the state health officer.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§169. Groundwater

A. A groundwater source includes all water obtained from:

1. dug;

2. drilled;

3. bored or driven wells;

4. springs; and

5. infiltration lines.

B. Groundwater quantity shall conform to the following standards.

1. Source capacity. The total developed groundwater source capacity, unless otherwise specified by the state health officer, shall equal or exceed the design maximum day demand with the largest producing well out of service.

2. Number of sources. When groundwater is the only source of water supply for any community water supply or for any non-community water supply serving a hospital, a minimum of two approved and active groundwater wells (or, if not a second well, connection to another approved water supply of sufficient capacity) shall be provided, unless otherwise specified by the state health officer.

a. Each of these two groundwater wells (or, if not a second well, connection to another approved water supply of sufficient capacity) shall be maintained and regularly operated to ensure that each one can immediately supply safe drinking water into the system when the other fails.

b. Consideration should be given to locating redundant sources in different aquifers or different locations of an aquifer.

3. Standby power. To ensure continuous service provided by any community water supply and any non-community water supply serving a hospital when the primary power has been interrupted, a standby power supply shall be provided through a dedicated portable or in-place

auxiliary power of adequate supply and connectivity. When automatic pre-lubrication of pump bearings is necessary, and an auxiliary power supply is provided, design shall assure that the pre-lubrication is provided when auxiliary power is in use.

C. Groundwater Quality shall conform to the following standards.

1. An assessment should be made of the factors, both natural and man-made, which may affect water quality in the well and aquifer. Such an assessment may include, obtaining samples over a sufficient period of time to assess the microbiological and physical characteristics of the water including dissolved gases, chemical, and radiological characteristics.

2. Unless LDH-OPH's exclusion criteria are met, a ground water under the direct influence of surface water (GWUDISW) determination acceptable to the state health officer shall be provided for all new wells.

a. Part of this determination shall include the proper submission of one or more 1 micron filters through which at least 500 gallons of produced groundwater being tested have passed at a regulated flow rate over a period of no more than a 24 hours.

b. Such filters shall be refrigerated, as appropriate, and delivered to a laboratory for the identification of insects or other macroorganisms, algae, rotifers and large diameter pathogens such as Giardia or Cryptosporidium [see USEPA's "Consensus Method for Determining Groundwaters under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA)"].

c. The laboratory utilized shall be recognized by the USEPA for such work and it shall identify such macroorganisms found on the filter and, in the case of Giardia or Cryptosporidium, whether any observed specimens were alive or dead.

d. In addition, the laboratory report shall indicate the overall risk as being either a low, medium, or high occurrence of such macroorganisms.

e. This information, in combination, with other factors mentioned under the definition of GWUDISW contained in Chapter 11 of this Part, shall be used by the state health officer in determining whether or not a new well will be deemed as a GWUDISW source.

3. Microbiological quality. After disinfection of each new, modified or reconditioned groundwater source, one or more water samples shall be submitted to a LDH-OPH-certified drinking water laboratory for microbiological analysis with satisfactory results reported to the state health officer prior to placing the well into service.

4. Physical, chemical and radiological characteristics. Every new, modified or reconditioned groundwater source shall be examined for applicable physical, chemical and radiological characteristics as required by the state health officer by tests of representative samples in a LDH-OPH certified drinking water laboratory, with results reported to the state health officer.

a. Samples shall be collected and analyzed at the conclusion of the test pumping procedure.

b. Field determinations of physical and chemical constituents or special sampling procedures may be required by the state health officer.

D. Groundwater location shall conform to the following requirements.

1. Well location. The state health officer shall be consulted prior to design and construction regarding proposed well location as it relates to required separation between existing and potential sources of contamination and groundwater development.

a. All ground water sources of water supply shall comply with the following requirements.

i. The ground surface within a safe horizontal distance of the source in all directions shall not be subject to flooding (as defined in Footnote 4 of a.ii below) and shall be so graded and drained as to facilitate the rapid removal of surface water. This horizontal distance shall in no case be less than 10 feet for potable water supplies.

ii. Every potable water well, and the immediate appurtenances thereto that comprise the well, shall be located at a safe distance from all possible sources of contamination, including but not limited to, privies, cesspools, septic tanks, subsurface tile systems, sewers, drains, barnyards and pits below the ground surface. The horizontal distance from any such possible source of pollution shall be as great as possible, but in no case less than the following minimum distances, except as otherwise approved by the state health officer.

Table 169.D.1.a.ii. Sources of Contamination	**Distance in Feet**
Septic tanks	50
Storm or sanitary sewer	50[1]
Cesspools, outdoor privies, oxidation ponds, subsurface absorption fields, pits, mechanical sewage treatment plants, etc.	100[2]
Another water-well	25[3]
Sanitary landfills, feed lots, manure piles, solid waste dumps and similar installations	100
Drainage canal, ditch or stream	50[4]

[1] This distance may be reduced to 30 feet if the sewer is of ductile iron with water-tight joints or pressure rated plastic pipe.

[2] For a private water well this distance may be reduced to 50 feet.

[3] This minimum distance requirement does not take into consideration the effects of interference from pumping nearby wells in the same aquifer.

[4] Horizontally measured from the water's edge to the well at the highest water level which may have occurred in a 10-year period.

iii. No toilet, sewer, soil pipe or drain shall be located above or where leakage therefrom can reach any water storage basin, reservoir or source of water supply.

iv. There shall be no unauthorized pits or unfilled spaces below level of ground surface, any part of which is within 50 feet of such water supply, except properly constructed well, pump, or valve pits as covered under §329.A.4 of this Part.

v. Earth formations above the water-bearing stratum shall be of such character and depth as to exclude contamination of the source of supply by seepage from the surface of the ground.

b. A well shall be located far enough from a building to allow reworking or rehabilitation with a drilling rig. A well shall not be located below ground surface, such as in pits and basements, and shall not be located within the foundation of a building, except a building constructed solely to house pumping and water system equipment.

c. Groundwater development shall be in conformance with the applicable standards, laws, and regulations of the government agency or agencies having jurisdiction.

2. Continued sanitary protection of the well site from potential sources of contamination shall be provided by having a minimum 50-foot radius of ownership and a minimum 100-foot radius of control from the well head. The radius of control required beyond the minimum 50-foot radius of ownership shall be provided either through ownership, zoning, easements, leasing or other means acceptable to the state health officer which shall be maintained for the life of the well until the well is ultimately properly abandoned.

3. Wellhead protection. Wellhead protection assessment for continued protection of the wellhead from potential sources of contamination shall be provided as determined by the state health officer.

E. General well construction. All wells constructed to serve a potable water supply shall be constructed in accordance with LAC 56, Part I - Water Wells. Drillers of wells that serve a potable water supply shall comply with these requirements pursuant to Louisiana Revised Statutes 38:2226, 38:3098-3098.8. In addition, the following requirements shall be met.

1. Drilling fluids and additives shall:

a. not impart any toxic substances to the water or promote bacterial contamination; and

b. be acceptable to the state health officer.

2. Minimum protected depths of drilled wells shall provide watertight construction to such depth as may be required by the state health officer, to:

a. exclude contamination; and

b. seal off formations that are, or may be, contaminated or yield undesirable water.

3. All well and spring basin casings or curbings shall extend a safe distance below the ground surface. The minimum depth of casings or curbings shall not be less than 50 feet in the case of public water supplies and not less than 10 feet in the case of private water supplies.

4. Polyvinyl chloride plastic. The state health officer may approve the use of PVC casing for all or for limited applications. PVC casing shall not be used at sites where permeation by hydrocarbons or degradation may occur.

5. Other Nonferrous Casing Materials. Approval of the use of any nonferrous material as well casing shall be subject to special determination by the state health officer prior to submission of plans and specifications. Nonferrous material proposed as a well casing must be resistant to the

corrosiveness of the water and to the stresses to which it will be subjected during installation, grouting and operation.

6. Packers. Packers shall be of material that will not impart taste, odor, toxic substances or bacterial contamination to the well water. Lead packers shall not be used.

7. Screens. Screens shall be provided with a bottom plate or washdown bottom fitting of the same material as the screen.

8. Upper terminal well construction shall be in accordance with the following requirements.

a. In wells with pipe casings, the casings shall project at least 12 inches above ground level or the top of the cover or floor, and the cover or floor shall slope away from the well casing or suction pipe in all directions.

i. Dug well linings shall extend at least 12 inches above the ground surface and cover installed thereon. The cover shall be watertight, and its edges shall overlap and extend downward at least 2 inches over the walls or curbings of such wells.

ii. In flood-prone areas the top of the casing shall be at least two feet above the 100-year flood elevation, but in no case less than two feet above the ground surface.

b. Where a well house is constructed, the floor surface shall be at least six inches above the final ground elevation.

c. Sites subject to flooding shall be provided with an earth mound to raise the pumphouse floor to an elevation at least two feet above the 100-year flood elevation or other suitable protection as determined by the state health officer.

d. Protection from physical damage shall be provided as required by the state health officer.

e. The upper terminal shall be constructed to prevent contamination from entering the well.

f. Where well appurtenances protrude through the upper terminal, the connections to the upper terminus shall be mechanical or welded connections that are water tight.

9. Disinfection of every new, modified or reconditioned groundwater source shall:

a. be provided after completion of work, if a substantial period elapses prior to test pumping or placement of permanent pumping equipment;

b. be provided after placement of permanent pumping equipment; and

c. be done in accordance with AWWA C654 or method approved by the state health officer.

10. Well Abandonment. Abandoned water wells and well holes shall be plugged in accordance with LAC 56, Part I - Water Wells.

F. Testing and records shall comply with the following requirements.

1. Yield and Drawdown Tests shall:

a. be conducted in accordance with a protocol pre-approved by the reviewing authority.

b. be performed on every production well after construction or subsequent treatment and prior to placement of the permanent pump.

c. utilize methods clearly indicated in the project specifications.

d. be performed with a test pump with a capacity at least 1.5 times the flow anticipated at maximum anticipated drawdown.

e. shall provide, as a minimum, for continuous pumping for at least 24 hours at the design pumping rate or until stabilized drawdown has continued for at least six hours when test pumped at 1.5 times the design pumping rate, or as required by the state health officer.

f. provide the following data to be submitted to the state health officer:

i. test pump capacity-head characteristics;

ii. static water level;

ii. depth of test pump setting;

iii. time of starting and ending each test cycle; and

iv. the zone of influence for the well or wells.

g. provide a report which details recordings and graphic evaluation of the following at one hour intervals or less as may be required by the state health officer:

i. pumping rate;

ii. pumping water level;

iii. drawdown; and

iv. water recovery rate and levels.

h. At the discretion of the state health officer, more comprehensive testing may be required.

2. Plumbness and alignment shall conform to the following requirements.

a. Every well shall be tested for plumbness and alignment in accordance with AWWA Standard for Water Wells (A100).

b. The test method and allowable tolerance shall be clearly stated in the specifications.

c. If the well fails to meet these requirements, it may be accepted by the engineer if it does not interfere with the installation or operation of the pump or uniform placement of grout or affect long term integrity.

3. Geological data shall:

a. be determined from samples collected at 5-foot intervals and at each pronounced change in formation;

b. be recorded and submitted to the Louisiana Department of Natural Resources, Office of Conversation (DNR-OC) and the state health officer.

c. be supplemented with a driller's log, accurate geographical location such as latitude and longitude or GIS coordinates, and other information on accurate records of drill hole diameters

and depths, assembled order of size and length of casing, screens and liners, grouting depths, formations penetrated, water levels, and location of any blast charges.

4. The owner of each well shall retain all records pertaining to each well, until the well has been properly abandoned.

G. Aquifer Types and Construction Methods. Aquifer types and construction methods shall conform to the following requirements.

1. Criteria for sand or gravel wells.

a. If clay or hard pan is encountered above the water bearing formation, the permanent casing and grout shall extend through such materials or at least 50 feet below the original ground elevation, whichever is lower.

b. If a sand or gravel aquifer is overlaid only by permeable soils the permanent casing and grout shall extend to at least 50 feet below original or final ground elevation, whichever is lower. Excavation of topsoil around the well casing should be avoided.

c. If a temporary surface casing is used, it shall be completely withdrawn.

d. If a permanent surface casing is used, it shall be grouted in place.

2. The following requirements shall apply to gravel pack materials.

a. Gravel pack materials shall

i. be sized based on sieve analysis of the formation; and

ii. be well-rounded particles, 95 percent siliceous material, that are smooth and uniform, free of foreign material, properly sized, washed and then disinfected immediately prior to or during placement.

b. Gravel pack installation shall:

i. be in one continuous operation.

ii. provide the material be placed in a manner that prevents segregation and gradation during placement.

c. The annular space between the well screen and the hole shall be adequate to allow proper placement of gravel pack.

d. Gravel refill pipes, when used, shall be Schedule 40 steel pipe incorporated within the pump foundation and terminated with screwed or welded caps at least 12 inches above the pump house floor.

e. Gravel refill pipes located in the grouted annular opening shall be surrounded by a minimum of 1 ½ inches of grout.

f. Gravel pack shall extend above the highest well screen with an allowance for settling.

g. Protection from leakage of grout into the gravel pack or screen shall be provided.

h. Permanent inner casing and outer casings shall meet requirements of §169.E.4 of this Part.

3. Radial collectors shall conform to the following:

a. Locations of all caisson construction joints and porthole assemblies shall be indicated.

b. The caisson wall shall be reinforced to withstand the forces to which it will be subjected.

c. Radial collectors be in areas and at depths approved by the state health officer.

d. Provisions shall be made to assure that radial collectors are essentially horizontal.

e. The top of the caisson shall be covered with a watertight floor.

f. All openings in the floor shall be curbed and protected from entrance of foreign material.

g. The pump discharge piping shall not be placed through the caisson walls. In unique situations where this is not feasible, a water tight seal must be obtained at the wall.

4. Infiltration lines should be considered only where geological conditions preclude the possibility of developing an acceptable drilled well.

a. The area around infiltration lines shall be under the control of the water purveyor for a distance acceptable to or required by the state health officer.

b. Flow in the lines shall be by gravity to the collecting well.

c. Water from infiltration lines shall be considered as groundwater under the direct influence of surface water unless demonstrated otherwise.

5. Limestone or sandstone wells, where the depth of unconsolidated formations is more than 50 feet, the permanent casing shall be firmly seated in uncreviced or unbroken rock.

a. Grouting requirements shall be determined by the state health officer.

b. Where the depth of unconsolidated formations is less than 50 feet, the depth of casing and grout shall be at least 50 feet or as determined by the state health officer.

6. Naturally flowing wells shall require special consideration by the state health officer where there is an absence of an impervious confining layer.

a. Flow shall be controlled. Overflows shall discharge at least 18 inches above grade and flood level, and be visible. Discharge shall be to an effective drainage structure.

b. Permanent casing and grout shall be provided.

c. If erosion of the confining bed appears likely, special protective construction may be required by the state health officer.

H. Well pumps, Discharge piping and Appurtenances. Well pumps, discharge piping and appurtenances shall conform to the following requirements.

1. Line Shaft pumps. Wells equipped with line shaft pumps shall:

a. have the casing firmly connected to the pump structure or have the casing inserted into a recess extending at least one-half inch into the pump base;

b. have the pump foundation and base designed to prevent water from coming into contact with the joint; and

c. avoid the use of oil lubrication at pump settings less than 400 feet. Lubricants must meet NSF/ANSI Standard 61 or be approved by the state health officer.

d. All water pumps shall be so constructed and installed as to prevent contamination of the water supply.

i. Where pumps or pump motors are placed directly over the well, the pump or motor shall be supported on a base provided therefor. The well casing shall not be used to support pump or motor. This requirement shall not apply to submersible pumps/motors and single-pipe jet pumps/motors. The pump or motor housing shall have a solid watertight metal base without openings to form a cover for the well, recessed to admit the well casing or pump suction. The well casing or pump suction shall project into the base at least 1 inch above the bottom thereof, and at least 1 inch above the level of the foundation on which the pump rests. The well casing shall project at least 12 inches above ground level or the top of the floor.

ii. Where power pumps are not placed directly over the well, the well casing shall extend at least 12 inches above the floor of the pump house. In flood-prone areas the top of the casing shall extend at least two feet above the 100-year flood elevation, but in no case less than two feet above the ground surface. The annular space between the well casing and the suction pipe shall be closed by a sanitary well seal to prevent the entrance of contamination.

2. Submersible Pumps. Where a submersible pump is used:

a. the top of the casing shall be effectively sealed against the entrance of water under all conditions of vibration or movement of conductors or cables; and

b. the electrical cable shall be firmly attached to the riser pipe at 20 foot intervals or less.

3. Discharge Piping. The design criteria for discharge piping is as follows.

a. The discharge piping shall:

i. be designed to minimize friction loss;

ii. have control valves and appurtenances located above the pumphouse floor when an above-ground discharge is provided;

iii. be protected against the entrance of contamination;

iv. be equipped with a check valve in or at the well, a shutoff valve, a pressure gauge, and a means of measuring flow;

v. be equipped with a smooth nosed sampling tap located at a point before any treatment chemicals are applied. The sample tap shall be at least 18-inches above the floor to facilitate sample collection.

vi. where applicable, be equipped with an air release-vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a down-turned position at least 18 inches above the floor and covered with a 24 mesh corrosion resistant screen;

vii. be valved to permit test pumping and control of each well;

viii. have all exposed piping, valves and appurtenances protected against physical damage and freezing;

ix. be properly anchored to prevent movement, and be properly supported to prevent excessive bending forces;

x. be protected against surge or water hammer;

xi. conform to §235 of this Part; and

xii. be constructed so that it can be disconnected from the well or well pump to allow the well pump to be pulled.

b. The discharge piping should be provided with a means of pumping to waste, but shall not be directly connected to a sewer.

c. For submersible, jet and line shaft pumps, the discharge, drop or column piping inside the well shall:

i. conform to §235 of this Part; where such standards exist, or in the absence of such standards, conform to applicable product standards and be acceptable to the state health officer. Any lubricants, fittings, brackets, tape or other appurtenances shall meet NSF/ANSI Standards 60/61, where applicable;

ii. be capable of supporting the weight of the pump, piping, water and appurtenances and of withstanding the thrust, torque and other reaction loads created during pumping. The actions of fatigue from repeated starting and stopping of the pump shall be considered when choosing a pipe and fittings;

iii. be fitted with guides or spacers to center piping and well pump in the casing.

4. Pitless Well Units. Pitless well units shall conform to the following standards and requirements.

a. The state health officer must be contacted for approval of specific applications of pitless units.

b. Pitless units shall:

i. be shop-fabricated from the point of connection with the well casing to the unit cap or cover;

ii. be threaded or welded to the well casing;

iii. be of watertight construction throughout;

iv. be of materials and weight at least equivalent and compatible to the casing;

v. have field connection to the lateral discharge from the pitless unit of threaded, flanged or mechanical joint connection; and

vi. terminate at least 18 inches above final ground elevation or three feet above the 100-year flood level or the highest known flood elevation, whichever is higher, or as the state health officer directs.

c. The design of the pitless unit shall make provision for:

i. access to disinfect the well;

ii. a properly constructed casing vent meeting the requirements of §169.H.6 of this Part;

iii. facilities to measure water levels in the well (see §169.H.7);

iv. a cover at the upper terminal of the well that will prevent the entrance of contamination;

v. a contamination-proof entrance connection for electrical cable;

vi. an inside diameter as great as that of the well casing, up to and including casing diameters of 12 inches, to facilitate work and repair on the well, pump, or well screen; and

vii. at least one check valve within the well casing or in compliance with requirements of the state health officer.

d. If the connection to the casing is by field weld, the shop-assembled unit must be designed specifically for field welding to the casing. The only field welding permitted will be that needed to connect a pitless unit to the casing.

5. Pitless Adapters. Pitless adapters may be acceptable at the discretion of the state health officer. The use of any pitless adapter must be pre-approved by the state health officer.

6. Casing Vent. All potable water well casings shall be vented to atmosphere as provided below, with the exception that no vent will be required when single-pipe jet pumps are used.

a. All potable water well vents shall be so constructed and installed as to prevent the entrance of contamination.

b. All vent openings shall be piped water tight to a point not less than 24 inches above the 100-year flood elevation, but in no case less than 24 inches above the ground surface.

i. Such vent openings and extensions thereof shall be not less than 1/2 inch in diameter, covered with a 24 mesh, corrosion resistant screen with extension pipe firmly attached thereto.

ii. The openings of the vent pipes shall face downward and shall be screened to prevent the entrance of foreign matter.

7. Water Level Measurement. Provisions shall be made for periodic measurement of water levels in the completed well.

a. Where pneumatic water level measuring equipment is used it shall be made:

i. using corrosion-resistant materials attached firmly to the drop pipe or pump column; and

ii. in such a manner as to prevent entrance of foreign materials.

8. Liners may be acceptable at the discretion of the state health officer. The use of any liner must be pre-approved by the state health officer.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

Subchapter D. Treatment

§171. General Requirements

A. The design of treatment processes and devices shall depend on evaluation of the nature and quality of the particular water to be treated, seasonal variations, the desired quality of the finished water and the mode of operation planned. Facilities shall be planned with future requirements in mind such as: tightened regulatory requirements, ability to obtain funding, potential growth, expansion and deterioration of existing facilities.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§173. Microscreening

A. Microscreening is a mechanical treatment process capable of removing suspended matter and organic loading from surface water by straining. It shall not be used in place of filtration or coagulation.

1. Design. Design criteria is as followed.

a. consideration shall be given to the following:

i. nature of the suspended matter to be removed;

ii. corrosiveness of the water;

iii. effect of chemicals used for pre-treatment;

iv. duplication of units for continuous operation during equipment maintenance;

v. provision of automated backwashing

b. shall provide:

i. a durable, corrosion-resistant screen;

ii. provisions to allow for by-pass of the screen;

iii. protection against back-siphonage when potable water is used for backwashing;

iv. proper disposal of backwash waters (See Subchapter F. §§257-275 of this Part).

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§175. Clarification Design

A. Clarification is generally considered to consist of any process or combination of processes which reduce the concentration of suspended matter in drinking water prior to filtration.

B. Plants designed to treat surface water, groundwater under the direct influence of a surface water, or for the removal of a primary drinking water contaminant shall have the ability to meet the plant's average daily flow of the maximum month with one unit out of service. Design of the clarification process shall:

1. be constructed to permit units to be taken out of service without disrupting operation, and with drains or pumps sized to allow dewatering in a reasonable period of time;

2. provide multiple-stage treatment facilities when required by the state health officer; and

3. minimize hydraulic head losses between units to allow future changes in processes without the need for repumping.

C. Presedimentation. Waters containing high turbidity may require pretreatment, usually sedimentation, with or without the addition of coagulation chemicals.

1. Basin Design. Presedimentation basins should have hopper bottoms or be equipped with continuous mechanical sludge removal apparatus, and provide arrangements for dewatering.

2. Inlet. Incoming water shall be dispersed across the full width of the line of travel as quickly as possible to prevent short-circuiting.

3. Bypass. Provisions for bypassing presedimentation basins shall be included.

4. Detention time. Detention shall consider removal requirements for the unit.

D. Coagulation. Coagulation refers to a process using coagulant chemicals and mixing by which colloidal and suspended material are destabilized and agglomerated into settleable or filterable flocs, or both. The engineer shall submit the design basis for the velocity gradient (G value) selected, considering the chemicals to be added and water temperature, color and other related water quality parameters. For surface water plants using direct or conventional filtration, the use of a primary coagulant is required at all times.

1. Mixing. The detention period should be instantaneous, but not longer than thirty seconds with mixing equipment capable of imparting a minimum velocity gradient (G) of at least 750 feet per second per feet (fps/ft). The design engineer should determine the appropriate G value and detention time through jar testing.

2. Equipment. Basins should be equipped with devices capable of providing adequate mixing for all treatment flow rates. Static mixing may be considered where the flow is relatively constant and will be high enough to maintain the necessary turbulence for complete chemical reactions.

3. Location. The coagulation and flocculation basin shall be as close together as practical.

4. Flow shall be determined at the point of coagulant dosing.

E. Flocculation. Flocculation refers to a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable or filterable particles through gentle stirring by hydraulic or mechanical means.

1. Basin design. Inlet and outlet design shall minimize short-circuiting and destruction of floc. Basins shall be designed so that individual basins may be isolated without disrupting plant operation. A drain and/or pumps shall be provided to handle dewatering and sludge removal.

2. Detention. Detention shall account for regulatory requirements for the plant.

3. Equipment. Agitators shall be designed to provide variable peripheral speed of paddles ranging from 0.5 to 3.0 feet per second.

4. Other designs. Variations or alternate designs can be submitted to the state health officer at any time.

5. Piping. Flocculation and sedimentation basins shall be as close together as practical. The velocity of flocculated water through pipes or conduits to settling basins shall be no less than 0.5 feet per second (fps) and no greater than 1.5 fps. Allowances must be made to minimize turbulence at bends and changes in direction.

F. Sedimentation. Sedimentation refers to a process that allows particles to settle by gravity and typically precedes filtration. The detention time for effective clarification is dependent upon a number of factors related to basin design and the nature of the raw water. The following criteria apply to the design of conventional gravity sedimentation units:

1. A minimum of four hours of settling time shall be provided. This may be reduced to two hours for lime-soda softening facilities treating only groundwater. Reduced detention time may also be approved when equivalent effective settling is demonstrated or when the overflow rate is not more than 0.5 gallons per minute [gpm] per square foot [sqft] (1.2 m/hr).

2. Inlet devices. Inlets shall be designed to distribute the water equally and at uniform velocities. A baffle should be constructed across the basin close to the inlet end and should project several feet below the water surface to dissipate inlet velocities and provide uniform flows across the basin.

3. If flow is split, a means of measuring the flow to each train or unit shall be provided.

4. Velocity. The velocity through a sedimentation basin should not exceed 0.5 feet per minute. The basins shall be designed to minimize short-circuiting. Fixed or adjustable baffles shall be provided as necessary to achieve the maximum potential for clarification.

5. If flow is split, it is recommended that a means of modifying the flow to each train or unit be provided.

6. Outlet devices. Outlet weirs or submerged orifices shall maintain velocities suitable for settling in the basin and minimize short-circuiting. The use of submerged orifices is recommended in order to provide a volume above the orifices for storage when there are fluctuations in flow. Outlet weirs and submerged orifices shall be designed as follows:

a. The rate of flow over the outlet weirs or through the submerged orifices shall not exceed 20,000 gallons per day per foot (250 m3/day/m) of the outlet launder or orifice circumference.

b. Submerged orifices located greater than three feet below the flow line shall be justified.

c. The entrance velocity through the submerged orifices shall not exceed 0.5 feet per second.

7. Overflow. An overflow weir or pipe designed to establish the maximum water level desired on top of the filters shall be provided. The overflow shall discharge by gravity with a free fall. The discharge shall be equipped with monitoring equipment to annunciate the overflow or be installed at a location where the discharge can be observed.

8. Drainage. Sedimentation basins shall be provided with a means for dewatering. Basin bottoms shall slope toward the drain where mechanical sludge collection equipment is not required.

9. Flushing lines or hydrants shall be provided and shall be equipped with backflow

prevention devices acceptable to the state health officer.

10. Sludge collection system shall be designed to ensure the collection of sludge from throughout the basin.

11. Sludge removal design shall provide that:

a. sludge pipes shall be not less than three inches in diameter and arranged to facilitate cleaning;

b. entrance to sludge withdrawal piping shall prevent clogging;

c. valves shall be operable from outside the tank;

d. the operator can observe and sample sludge being withdrawn from the unit.

G. Solids Contact Unit. Plants designed to treat surface water, groundwater under the direct influence of surface water or are required to meet primary drinking water standards using solids contact shall have a minimum of two units. The clarifiers shall be designed for the average daily flow of the maximum month such that the plant's design capacity can be met with one unit out of service.

1. Operating equipment shall include:

a. adequate piping with suitable sampling taps or other means to sample sludge located to permit the collection of samples from various depths of the units; and

b. if flow is split, a means of measuring and modifying the flow to each unit.

2. Consideration shall be given to chemical feed location to ensure proper dosing and application.

3. A rapid mix device or chamber ahead of solids contact units may be required by the state health officer to assure proper mixing of the chemicals applied. Mixing devices within the unit shall be constructed to:

a. provide good mixing of the raw water with previously formed sludge particles; and

b. prevent deposition of solids in the mixing zone.

4. Flocculation. Flocculation equipment:

a. shall be adjustable (speed and/or pitch);

b. shall provide for coagulation in a separate chamber or baffled zone within the unit;

c. should provide a flocculation and mixing period of at least 30 minutes.

5. Sludge concentrators. Large basins should have at least two sumps for collecting sludge located in the central flocculation zone.

6. Sludge removal design shall provide that:

a. sludge pipes are not less than three inches in diameter and so arranged as to facilitate cleaning;

b. entrance to sludge withdrawal piping shall prevent clogging;

c. valves shall be located outside the tank for accessibility, and

d. the operator may observe and sample sludge being withdrawn from the unit.

7. Criteria for backflow protection from cross-connections shall be as follows.

a. Blow-off outlets and drains shall terminate in a location with an acceptable air gap for backflow protection.

b. A backflow prevention device shall be included on potable water lines used to back flush sludge lines.

8. Detention period. The detention time shall be established on the basis of the raw water characteristics, regulatory requirements and other local conditions that affect the operation of the unit.

9. Water losses. Units shall be provided with controls to allow for adjusting the rate or frequency of sludge withdrawal.

10. Weirs or orifices. The units should be equipped with either overflow weirs or orifices constructed so that water at the surface of the unit does not travel over 10 feet horizontally to the collection trough.

a. Weirs shall be adjustable, and at least equivalent in length to the perimeter of the tank.

b. Weir loading shall not exceed:

i. 10 gpm per foot of weir length (120 L/min/m) for clarifiers;

ii. 20 gpm per foot of weir length (240 L/min/m) for softeners.

c. Where orifices are used the loading rates per foot of launder rates should be equivalent to weir loadings. Either shall produce uniform rising rates over the entire area of the tank.

11. Upflow rates. Unless supporting data is submitted to the State Health Officer to justify rates exceeding the following, rates shall not exceed:

a. 1.0 gpm/sqft (2.4 m/hr) at the sludge separation line for units used for clarifiers;

b. 1.75 gpm/sqft (4.2 m/hr) at the slurry separation line, for units used for softeners.

H. Tube or plate settlers. Settler units consisting of variously shaped tubes or plates which are installed in multiple layers and at an angle to the flow may be used for sedimentation, following flocculation. Proposals for settler unit clarification must demonstrate satisfactory performance under on-site pilot plant conditions or documentation of full scale plant operation with similar raw water quality conditions as allowed by the state health officer prior to the preparation of final plans and specifications for approval.

1. General design criteria for tube or plate settlers is as follows:

a. Inlet and outlet considerations. Design to maintain velocities suitable for settling in the basin and to minimize short-circuiting. Plate units shall be designed to minimize maldistribution across the units.

b. Protection from freezing. In areas where freezing occurs, consideration shall be given regarding sufficient freeboard.

c. Application rate for tubes. A maximum rate of 2 gallon per minute per square foot [gpm/sqft] of cross-sectional area (4.8 m/hr) for tube settlers, unless higher rates are successfully shown through pilot plant or in-plant demonstration studies.

d. Application rates for plates. A maximum plate loading rate of 0.5 gpm/sqft (1.2 m/hr), based on 80 percent of the projected horizontal plate area.

e. Flushing lines shall be provided to facilitate maintenance and must be properly protected against backflow or back siphonage.

f. Drain piping from the settler units shall be sized to facilitate a quick flush of the settler units and to prevent flooding other portions of the plant.

g. Placement. Modules shall be placed:

i. in zones of stable hydraulic conditions; and

ii. in areas nearest effluent launders for basins not completely covered by the modules.

h. Inlets and outlets shall conform to §175.F.2 and §175.F.6 of this Part.

i. The support system shall be able to carry the weight of the modules when the basin is drained plus any additional weight to support maintenance.

j. Provisions shall be made to allow the water level to be dropped, and a water or air jet system for cleaning the modules.

I. High rate clarification processes. High rate clarification processes may be approved upon demonstrating satisfactory performance under on-site pilot plant conditions or documentation of full scale plant operation with similar raw water quality conditions as allowed by the state health officer.

AUTHORITY NOTE: Promulgated in accordance with the provisions of R.S. 40:4.A.(8), 40:4.13.D.(1)(2) and 40:5.A.(2)(3)(5)(6)(7)(17).

HISTORICAL NOTE: Promulgated by the Department of Health, Office of Public Health, LR 44:

§177. Filtration Design

A. Rapid rate gravity filters. General design criteria for rapid rate gravity filters is as follows.

1. Pretreatment. The use of rapid rate gravity filters shall require pretreatment.

2. Rate of filtration. The rate of filtration shall be determined through consideration of such factors as raw water quality, degree of pretreatment provided, filter media, water quality control parameters, and competency of operating personnel. Typical filtration rates range from 2 to 4 gpm/sqft. Maximum filtration rates for plants treating surface waters or ground water under the influence of surface water shall not exceed 3.0 gpm/sqft. For surface water treatment plants with proposed filtration rates above 3.0 gpm/sqft, data from pilot testing shall be submitted to the state health officer for consideration and approval.

3. Number. Plants employing rapid rate gravity filters shall provide at least two filter units. The filters shall be capable of meeting the plant design capacity at the plants average daily flow of the maximum month with one filter unit removed from service. Where declining rate filtration is provided, the variable aspect of filtration rates, and the number of filters must be considered when determining the design capacity for the filters.

4. Structural details and hydraulics. The filter structure shall be designed to provide for:

a. vertical walls within the filter;

b. no protrusion of the filter walls into the filter media;

c. head room to permit normal inspection and operation;

d. minimum depth of filter box of 8.5 feet;

e. minimum water depth over the surface of the filter media of three feet;

f. trapped effluent to prevent backflow of air to the bottom of the filters;

g. prevention of floor drainage in to the filter;

h. prevention of flooding by providing overflow;

i. maximum velocity of treated water in pipe and conduits to filters of two feet per second;

j. cleanouts and straight alignment for influent pipes or conduits where solids loading is heavy, or following lime-soda softening;

k. washwater drain capacity to carry maximum flow;

l. handrails or walls around filter banks adjacent to normal walkways; and

m. construction to prevent cross connections and common walls between potable and non-potable water.

5. Washwater troughs should be constructed to have:

a. the bottom elevation above the maximum level of expanded media during washing;

b. a two-inch freeboard at the maximum rate of wash;

c. the top edge level and all at the same elevation;

d. spacing so that each trough serves the same number of square feet of filter area;

e. maximum horizontal travel of suspended particles to reach the trough not to exceed three feet;

f. means to exclude the loss of media when providing for concurrent air/high rate water backwashing; and

g. a two-inch freeboard at the main wash water gullet at the maximum rate of wash.

6. Filter material. The granular filter media shall be in accordance with AWWA B100 and have the following characteristics:

a. a total depth of not less than 24 inches and generally not more than 30 inches;

b. a uniformity coefficient of the smallest material not greater than 1.65;

c. a minimum of 12 inches of media with an effective size range no greater than 0.45 mm to 0.55 mm unless specified otherwise per the following.

i. Anthracite shall have:

(a). an effective size of 0.45 mm - 0.55 mm with uniformity coefficient not

greater than 1.65 when used alone;

(b). an effective size of 0.8 mm - 1.2 mm with a uniformity coefficient not greater than 1.7 when used as a cap; and

(c). an effective size for anthracite used as a single media on potable groundwater for iron and manganese removal only shall be a maximum of 0.8 mm (effective sizes greater than 0.8 mm may be approved based upon onsite pilot plant studies or other demonstration acceptable to the state health officer).

ii. Sand shall have:

(a). an effective size of 0.45 mm to 0.55 mm; and

(b). a uniformity coefficient of not greater than 1.65.

iii. High density sand shall have:

(a). an effective size of 0.2 to 0.3 mm;

(b). a uniformity coefficient of not greater than 1.65.

iv. Granular activated carbon (GAC) shall be in accordance with AWWA B604 and the design of shall meet the following:

(a). The media must meet the basic specifications for filter media as given in §177.A.6.a through §177.A.6.c of this Part.

(b). There shall be provisions for a free chlorine residual and adequate contact time in the water following the filters and prior to distribution (See §177.C and §177.D).

(c). There shall be means for periodic treatment of filter material for control of bacterial and other growth.

(d). Provisions shall be made for frequent replacement or regeneration. Regeneration of GAC shall be in accordance with AWWA B604.

v. Other media. Other media will be considered based on experimental data and operating experience.

d. Characteristics of support media shall include the following.

i. Torpedo sand. A three-inch layer of torpedo sand shall be used as a supporting media for filter sand where supporting gravel is used, and shall have:

(a). effective size of 0.8 mm to 2.0 mm; and

(b). uniformity coefficient not greater than 1.7.

ii. Gravel, when used as the supporting media shall consist of cleaned and washed, hard, durable, rounded silica particles and shall not include flat or elongated particles. The coarsest gravel shall be 2.5 inches in size when the gravel rests directly on a lateral system, and shall extend above the top of the perforated laterals. Not less than four layers of gravel shall be provided in accordance with the following size and depth distribution:

Table 175.A.6.e	
Size	**Depth**