

Arkansas Department of Health

Engineering Section, Operator Licensing Program

Ark. Department of Health Public Water System Compliance Course:

PWS Rules

Rules Pertaining to Public Water Systems

I. State Legislative Authority

- Original Act 96 of 1913,
- Act 8 of 1961
- Latest Update: January 27, 2020



Rules Pertaining to Public Drinking Water Systems

I. State Legislative Authority

- Latest Update: January 27, 2020
- https://www.healthy.arkansas.gov/images/uploads/rules/PublicWaterSyst emsFINAL.pdf



II. Purpose

The purpose of the PWS Rules is to ensure that all persons in the State of Arkansas receiving water from a public water system are provided with ample quantities of safe, palatable water which is in full compliance with the National Primary Drinking Water Regulations.



III. Definitions

- In order to understand the Rules, the <u>DEFINITIONS</u> provided should be read through in order to understand the content of the document.
- (Contaminant...Cross Connection... Distribution System...
 Operator...etc.)



IV. Applicability

These Rules apply to <u>all Public Water Systems</u> in the State of Arkansas.



So, What is a Public Water System?

A public water system provides water for human consumption and has <u>at least 15 service connections</u> <u>or serves at least an average of 25 individuals daily at</u> <u>least 60 days per year.</u>



Types of Public Water Systems

Community PWS

- Non-Community PWS
 - Transient
 - Non-Transient



Types of Public Water Systems

- Semi-Public Water Systems
- Semi-public water systems are water systems that serve water to the public but do not serve enough people to meet the definition of public water system by the federal Safe Drinking Water Act.
- Only State regulations apply.
- State regulations include among other items:
 - Continuous disinfection of the drinking water
 - Sanitary protection of the source
 - ADH approval of the source, system and any modificatons.



Community PWS

- Has at least 15 service connections used by yearround
- residents or regularly serves at least 25 yearround
- residents.
 - Examples: a municipality, rural water system, a mobile home park with an independent water source (well, spring)



A municipal water system with a visible elevated storage tank is a typical Community Water System.





Transient Non-Community PWS

- Any non-community water system that serves a <u>transient</u> population at least 60 days per year or a PWS that is <u>used as a</u> <u>source for bottled water</u>.
- (Must Have an independent water source, not a customer of another water system.)
- Examples: rest areas, restaurants and camp grounds.



An RV Park utilizing its own well for drinking water would be a typical Transient Non-Community water system.





Non-Community PWS

- Serves at least 25 of the <u>same</u> individuals at least 180 days per year
- Must Have an independent water source
- Examples: school, factory, water bottlers...etc.



A school that utilizes its own well for drinking water would be a typical Non-Transient Non-Community Water System





A water bottling company is also a typical Non-Transient Non-Community Water System





- Source water approval
- The quality of <u>new or additional sources</u> of water must be approved by the ADH before being made available for public use.



- Source water approval
 - ADH must approve additional and new drinking water sources.
 - ADH will sample and test proposed source to determine if the source qualifies for approval and the extent of treatment that the source water will require.
 - National secondary standards are also considered. Secondary standards are usually concerned with the aesthetics of the water. (examples: taste & odor-Sulphur, color-Iron, Mn).



Source water selection

- Best quality source available should be selected.
- Worse quality sources (polluted) should not be used unless other sources are not feasible and then only when adequate personnel, equipment, and operating procedures are proposed or in-place to purify and otherwise continuously protect the drinking water supply.
- Continuous source water protection is needed to ensure safe drinking water.
- Selecting the best quality source, and protecting that source, is the first "barrier" in the multi-barrier approach to providing safe drinking water.



- Treated drinking water must meet all National Primary Drinking Water Regulations.
- In Arkansas, the Arkansas Department of Health has been delegated by EPA to require and enforce compliance with federal Safe Drinking Water requirements.



- How are MCLs and MCLGs developed?
- (MCLG= Max. Contaminant Level Goal)

- The EPA:
- Identifies drinking water contaminants that are frequently found.
- Establishes priorities...which contaminant is the worst, next
- worst, etc...
- Proposes and finalizes a National Primary Drinking Water Regulation
 - After reviewing health effects studies, the EPA sets MCLGs and then sets MCL
 - The process of setting MCLs should be objective and reflect costs to comply versus benefits.
 - Unfortunately, the process is sometimes less than objective and scientific (political).



VI. Health Dept. Authority to Issue Orders

- Authority to Issue Orders, Alterations and Changes to PWS's
- ADH, in order to protect public health and ensure compliance, the ADH may exercise its legal authority and issue orders for:
 - The securing of a new source
 - The modification or addition of treatment facilities
 - Obtaining new or additional testing equipment
 - Modifications of monitoring/operating procedures
 - Long Range Plans, Technical or Managerial Reports...special reports: Filter Evaluation, etc.
 - Comprehensive Performance Evaluations--CPE



VI. Health Dept. Authority to Issue Orders

- Providing Emergency Water:
 - When public health emergency exists, ADH may order a public water system to provide water to another public water system for the duration of an emergency if the supplying system has excess capacity and the supplying system will be paid for the water.



- Every owner must operate the water supply (including the treatment plant and the distribution system) to meet the compliance standards set forth in the National Primary Drinking Water Regulations.
- Operators in responsible charge must be duly licensed (Act 333 of 1957).



- Monitoring
- Enables systems to determine if they follow regulations.
- *daily, monthly, quarterly, etc



<u>Records</u>

- Reports such as analyses and operational records shall be submitted to the ADH by the 10th day following the <u>month of record</u>.
- (For example, a July Report is due at ADH by Aug 10)
- Record Retention:
- Keep all correspondence, Records and Consumer Conf Reports at least 3 Yrs.
- Bacti Reports, Compliance Correspondence, Variances or Exemptions- 5 Yrs.
- Treatment Reports, Chemical Records, San Surveys, Engineering Reports-10 Years
- Lead & Copper Analyses, Reports, Surveys, Letters, Etc.-12 Years
- Optimal Corrosion Control Records-For Ever
- System plans and specifications for system should be kept indefinitely for piping and equipment in use by the system.



- Fluoridation: New Rule (Act 197 of 2011)
- All public water systems in Arkansas who serve populations of 5000 or more will Fluoridate their water when capital funds become available.
- Delta Dental is helping with funding.
- Population is determined by # of Service Connections x Census Household Factor.
 - (2,000 connections x 2.5 people/connection = 5,000 population served)



- <u>Cross-Connection Program</u>
- The owner shall institute a routine cross-connection program to locate and eliminate cross-connections. (Ordinance)





- Approved Chemicals, Materials, Equipment, and Processes
- All chemicals and materials in contact with water shall be listed with ANSI/NSF Standards 60 and 61.
 - Self-certification by the manufacturer will not be accepted.
 - Only unit processes, equipment, chemicals, and appurtenances shall be incorporated within a public water system as they conform to the latest edition of the applicable AWWA or "Ten States" standards, and are further approved by the ADH.



Emergency Planning

- Each Community Public Water System and each Non-Transient
- Non-Community Public Water System shall have a written emergency plan.
 - Names and telephone numbers of responsible utility employees
 - Emergency procedures
 - Should address both general and specific emergencies
 - Should be updated on an annual or more frequent basis
 - (Ask for an ADH Emergency Plan Outline)



- Long Range Plan
- Each system shall have a written long-range plan
 - To Address: Projected needs for source, treatment, storage, and distribution
 - To Address: Systems technical, financial, and managerial capacity as required to comply with the requirements of the Safe Drinking Water Act.
 - Planning period should be at least ten years
 - (Plan to Update every 5-years)



<u>Constructing of New Systems &</u> <u>Modification of Existing Systems</u>

- Must have written approval from the ADH
- Modifications requiring approval
 - Changes/additions in treatment equipment
 - Changes/additions to pump stations
 - Changes/additions of Bacti Sample Sites
 - Expansion/upgrades to Distribution System
 - Place or Type of Disinfection
 - Other: Contact ADH with any questions



VIII. GROUND WATER SUPPLIES

- Groundwater is naturally occurring water occupying the zone of saturation in the ground below the earth's surface.
- Groundwater accounts for approximately 60% of the earth's available freshwater.







High hydraulic-conductivity aquifer



Low hydraulic-conductivity confining unit



Very low hydraulic-conductivity bedrock



Direction of ground-water flow

VIII. GROUND WATER SUPPLIES

- Raw Water Quality
 - Shall not contain organic, inorganic or radio-active chemical contaminants,
 - Unless those contaminants can be reduced/removed to acceptable levels (below the MCL's) utilizing reasonable water treatment methods



VIII. GROUND WATER SUPPLIES

- Ground Water Under the Direct Influence of Surface Water (GWUDI)
 - Ground water with significant occurrence of insects or other macroorganisms, algae, organic debris, or large diameter pathogens such as Giardia Lamblia, or which is subject to significant changes in water quality in direct relationship with surface water conditions.


- Surface Drainage
- All wells must be located on a site having good surface drainage.
- Must be at a higher elevation and a safe distance from possible sources of contamination.
- The top of the well casing must extend 24 inches above the ground level or above the 100 year flood elevation, whichever is higher.



Proximity to Sources of Contamination

- Horizontal distances from potential contamination must be at least 100 feet.
- Chemical storage or disposal facilities shall not be located within 100 feet, without written approval of ADH.



- Proposed well sites
- The location of each proposed well must be approved in writing by the ADH prior to commencing construction.
- Work First with ADH Geologists



<u>Restricted Wellhead Protection Zone</u>

- Owners of water supplies utilizing a well source shall have a restricted wellhead protection zone around the well of at least 100 feet radius.
- Prohibits the conveyance, use, or storage of potential contaminants within the easement.







- Well Construction
- All public water wells shall be constructed in accordance with the latest edition of AWWA Standard A100, Arkansas Water Well Construction Rules and Regulations, and approved by the ADH.
- All wells must have an above-ground watertight casing extending underground to seal out surface water.
- The space between the well's earthen walls and the inner well casing shall be filled with impervious grout.



- Surface Protection
- When required, the well must be protected at the surface by a watertight slab or a platform extending a minimum of two (2) feet in all directions from the well, and sloped to provide drainage away from the well.









• Wellhead and pump:

- The discharge tee [or elbow] of the pump shall be above the pump room floor.
- Air-relief vent openings shall be 24 inches above floor and screened. [24 mesh]
- Each wellhead shall be provided with a raw water sample tap and the means for measuring drawdown.



- Well Abandonment
 - Consolidated Formation Wells:
 - Must be filled with cement to within to 2 feet of the surface
 - Unconsolidated Formation Wells:
 - Must be filled with sand or natural material to
 - 12 feet from the ground surface and then filled with bentonite or cement to within two feet of the surface



Additional Well Abandonment Requirements

Arkansas Water Well Construction Commission

Rules AWWCC: 096.00 Section 5.8

- A Report from a water well contractor to the AWWCC is due within 90 days of abandonment (file an abandonment form).
- Dependent on formation the well is located in (consolidated and unconsolidated)
- Proper procedures are used in order to help prevent surface water contamination and/or potential co-mingling of aquifers.
- AWWCC is part of the Natural Resources Division of the Dept. of Agriculture.



Arkansas Water Well Construction Commission Rules: 096.00

 Refer to Regulations regarding Consolidated Formations and Unconsolidated formations (5.8.41-5.8.5)













Raw Water Quality

- The water at the intake, based on the arithmetical average number of coliform organisms shall not exceed 5,000 per 100 ml. in any month, nor exceed this number in more than 20 percent of the monthly samples.
- Nor exceed 20,000 per 100 ml. in more than 5 percent of the samples.



Recreational activity on water bodies used for public water supplies is
limited where contamination and potential hazard is an issue.





- Water intake structures
- Buoys shall be located in the water supply reservoir at a minimum distance of 300 feet from the intake and the use of the water or land within this 300 foot zone shall be restricted to water supply activity.



- <u>Restricted Intake Zone</u>
- **River -** includes all land from the intake from the riverbank to a line 300 feet back if within 1/4 mile radius of the intake.
- Springs 300 feet radius from spring enclosure



- Filtration Required
- Surface water sources and
- Ground Water under the direct influence of surface water (GWUDI-well sources).



- Location:
 - Plants shall be located on sites having good drainage (not subject to flooding: above the 100-year Flood Plane).
- Chemical Feeding:
 - Chemicals: Adequate & Suitable (NSF 60 Certified) shall
 - be provided as required for an ADH- approved treatment process.



- [Rapid] Mixing and Flocculation:
 - Must be Designed, operated, and maintained to insure
 - adequate [optimal] mixing of chemicals
- Sedimentation Basins:
 - Are to be Designed and operated to maximize particulate
 - & chemical contaminant removal
- Filters:
 - Are to be Designed and operated so as to maximize
 - contaminant removal (polishing...)



- **Disinfection Equipment**:
 - To be Maintained in perpetual working order— have spare equipment
 - Ammonia or Electronic [chlorine] leak detectors shall be always kept on hand as a safety barrier, thus protecting nearby personnel
 - Adequate heat/cooling/ventilation, safety equipment, spare parts, and shall be provided



- Laboratory:
 - Lab facilities suitable for the accurate control [through various analyses] of the treatment processes.
 - Lab Equipment and Methods must meet EPA requirements.
 - May require certification by ADH.
- Plant Maintenance:
 - - Clean—daily removal of trash/debris accumulations
 - - Surrounding grounds shall be maintained...



XI. POTABLE WATER STORAGE TANKS





- Storage tanks shall be located above ground water level, unless approved by ADH, and be protected against flooding.
- Drainage [drains] shall not be connected to sewer or drain lines that could cause cross-connection backflow.





- The minimum distances from any sources of pollution shall be in accordance with Section VIII. [100 ft or more]
- Any sewer located within 100 feet of any storage tank that has a portion which is located below grade should be constructed with water-tight mechanical joints.



XI Ground level storage tank





- Overflows
- Overflow pipes shall discharge freely at 2" to 24" inches above ground or flood level.
- Shall be protected against backflow.
- The overflow outlet shall be turned downward or to the side.
- The outlet shall be protected from contamination. (screened or flap gate that closes tight)



- All potable water storage tanks shall be designed, inspected, repaired, and painted in accordance with the latest edition of the applicable AWWA standards. [D-102, D-103]
- All covers shall be water tight.
- Manway openings shall be fitted with raised water tight walls projecting at least 4 inches above the surrounding surface, with a solid water tight cover with edges projecting downward at least 2 inches around the outside frame.









- All manway openings shall be provided with a sturdy locking device.
- All vents shall be provided with 24-mesh screen.
- [Note: Need two Manways Above the Normal Full Water line]





- All water storage tanks shall be cleaned as often as necessary.
- After construction, repair (or cleaning) all new or modified water storage tanks shall be disinfected by AWWA Standard for Disinfection of Water Storage Facilities (C-652-92).
- Two (2) consecutive series of safe BacT samples not collected on the same day.







Typical Tank Design...Considerations:



- 2) Water Age- 24-to-72-hour storage
- 3) Tank Circulation & Freshness for DBP prevention...
- 4) Overflow Size to Match Max Inlet Flow...
- 5) Drain Should be at Tank Floor Level
- 6) Inlet and Outlet Should be Raised Above the Floor...





XII. Disinfection

- Disinfection of all public water supplies by a method approved by the ADH must be provided.
- Adequate residual of the disinfectant must be carried to all point throughout distribution system.



XIII. Booster Pump Station

- Located on sites having good surface drainage
- Pump suction lines must not reduce pressure in the suction line to less than 20 pounds per square inch.




XIV. Distribution System

• Shall be tested and constructed using materials and construction methods in accordance with AWWA and or "Ten States" standards and approved by the ADH.













- Water mains and sanitary sewers shall be constructed as far apart as practicable and shall be separated by undisturbed and compacted earth.
- A minimum horizontal distance of ten (10) feet should be maintained between water lines and sewer lines or other source of contamination.



- Water lines and sewers shall not be laid in the same trench, except by approval of ADH.
- Water mains unavoidably in close proximity to sewers must be placed so that the bottom of the water line will be at least 18 inches above the top of the sewer line at its highest point.



- If the 18 inches must unavoidably be reduced, the water line or sewer line must be encased in watertight pipe with sealed watertight ends extending at least ten (10) feet either side of the crossing.
- Any joint in the encasement must be mechanically restrained.



Safety Hazards

• A minimum horizontal distance of three feet shall be maintained between water lines and other underground utilities of a non-sanitary nature (gas, electric, etc.). Exceptions to this must be approved in writing by the Arkansas Department of Health.

AR One Call: 1-800-482-8998





Water Service & Sewage Disposal

Approved Sewage Disposal Required:

 No PWS shall provide service to a new building or residence in an unsewered area without written documentation that the ADH has approved plans for construction of a sewage disposal facility or that no disposal system approval is required by ADH for the building.



Plumbing Inspection Required

 No PWS shall provide new service to any building or residence until the customer provides written documentation that the service line and building plumbing has been inspected by a certified plumbing inspector and found to be in substantial compliance with the State Plumbing Code.



Plumbing fixtures shall be installed and maintained in accordance with the *ARKANSAS STATE PLUMBING CODE*.



• A minimum pressure of 20 pounds per square inch shall be maintained.*



* Only emergency situations are exceptions, and you must notify the ADH when they occur.



- An accurate up-to-date record shall be kept of the location of every item in the distribution system.
- All water pipes shall be located at sufficient depth to protect the pipe from direct effect of traffic and at least below the maximum frost depth.



- <u>Distribution Systems</u>:
- Valves shall be located at frequent intervals to permit isolation of any section for repairs or testing.
- Blow-off assemblies shall not be connected in a way that would permit back-siphonage into the distribution system.
- The discharge of blow-offs shall be located above natural grade, and be screened, capped, or plugged.



- <u>Distribution Systems</u>:
- Use of secondhand or used pipe is prohibited unless it was used for distribution of potable water or approved by ADH
 - **Disinfection of Pipe**:
 - All disinfection shall comply with the most recent AWWA C-651, "Standard Specifications for Disinfecting Water Mains"
 - Prior to placing water mains into service must obtain two (2) consecutive series of safe BacT samples not collected on the same day



Cross Connections

- <u>All</u> Public water systems in Arkansas are required by regulation to have a cross-connection control program in place after January 1, 1996.
- A <u>Cross Connection</u> is a physical connection between a public water supply and either an unsafe or a questionable quality water supply or any toxic or questionable material.



Cross Connection

- Domestic water shall not be provided to any device, equipment, or service connection which may permit the contamination of the water supply by back-siphonage or backflow.
- A backflow prevention device approved by the ADH must be installed to any service connection found to contain a cross-connection.



XVIII. Notification of ADH

• The owner shall report to the ADH within 48 hours failure to comply with any primary drinking water regulation.



XVIII. Notification of ADH

- Owner shall report to the ADH within 4 hours of the discovery or evaluation of an emergency condition.
- Owner shall report to the ADH within 2 days any change of Operator of Record.
- The owner shall notify the public of its failure to comply with the National Primary Drinking Water Regulations or of an emergency situation.



XVIII. APPROVED LABORATORIES

- ADH lab shall conduct analysis for the purpose of determining compliance with the National Primary Drinking Water Regulations.
- Routine examinations may be conducted by other water laboratories after they are duly certified by the ADH.



Submission of Plans and Specifications

- All plans for constructing or entering into a contract to construct a water supply system, source of supply, water purification plant or alteration thereto must be submitted and approved by the ADH.
- All new well locations must be approved by the ADH. Work with ADH Geologists.



Review Questions





A community water system has at least ____.

- A. 40 service connections
- B. 8 or more BacTs pulled each month
- C. 15 service connections
- D. A population greater than 1000

C. 15 service connections



To ensure compliance with the National Primary Drinking Water Regulations the ADH may require a system to___?

- A. buy a new service vehicle
- **B.** change manufacturing representatives
- C. secure a new source
- D. move its office

C. Secure a new source



A system may be required to provide water to another public water system during an emergency providing that the supplying system _____.

- A. will build a new line
- **B.** can double their rates
- C. has excess capacity
- **D.** can provide the proper capital
- C. Has excess capacity



<u>True and accurate reports of analysis and operational</u> records must be submitted to the ADH by the _____.

- A. end of the following month
- B. tenth of the following month
- C. first Tuesday of the following month
- D. first weekend of the following month
- B. Tenth of the following month



All persons holding positions of responsible charge of every community water system shall be _____.

- A. over 21 years of age
- B. a licensed plumber
- C. correctly licensed
- D. debt free
- C. Correctly licensed



All community public water systems shall have a

- A. written phone list
- B. written safety program
- C. written bonus plan
- D. written emergency plan

D. written emergency plan



All Community water systems shall have a written longrange plan that includes projected needs for source, treatment, storage, and distribution for a planning period of at least _____.

- A. 6 months
- B. ten years
- C. one century
- D. one pay period
- B. Ten years...update every 5-years



Every well must be located on a site having _____.

- A. no trees
- **B.** storage tanks
- C. a paved entrance
- D. proper drainage

D. proper drainage...[wellhead protection]



The horizontal distance between a well and a source of contamination must be at least _____.

- A. twice the distance of the casing in the well
- B. 1200 feet
- C. 100 feet
- D. the distance divided by the depth
- C. 100 feet



The _____ of each proposed well must be approved in writing by the ADH prior to commencing construction.

- A. chlorine supplier
- B. depth
- C. location
- D. casing grout

C. Location...work with ADH Geologists



Why must each well have an outside watertight casing?

- A. To keep water pressure at an adequate level
- B. To ensure chlorine is mixed properly
- C. To limit excessive pumping
- D. To exclude the entrance of undesirable water (e.g.— surface water, radiation bearing water, etc.)
- **D.** To exclude the entrance of undesirable water



All wells shall have a watertight slab or platform extending how far in all directions?

A. to the wall of the well houseB. 2 feetC. no slab neededD. 100 feet

B. 2 feet



All air-relief vent openings shall be how far above a pump house floor?

- A. 24 inches
- B. 2 inches
- C. four feet
- D. at least above the discharge tee
- A. 24 inches



All wells shall be provided with a _____ water sample tap and the means for measuring _____.

- A. cold, temperature
- B. round, speed
- C. frost free, turbidity
- D. raw, drawdown
- D. Raw, ...drawdown



Buoys shall be located in the water supply reservoir at a minimum distance of _____ feet from the lake.

A. 50B. 100C. 300D. 1000

C. 300



Minimum pressure in the distribution system must be

A. 10 psi
B. 20 psi
C. 100 psi
D. 5 psi

B. 20 psi


Notification of ADH is required _____.

A. within 48 hours of failure to comply with primary drinking water standards

- B. within 4 hours of an emergency
- C. neither
- D. both

D. Both



THE END

Would you like copies of:

PWS Rules National Primary Drinking Water Standards Cross Connection Program Outline Long Range Plan Outline Emergency Plan Outline

www.healthy.arkansas.gov/water-license ADH.water.licensing@arkansas.gov

