Arkansas Department of Health

Ark. Department of Health
Public Water System
Compliance Course:

PWS Rules

Arkansas Department of Health
Engineering Section

Rules Pertaining to Public Drinking Water Supplies

I. State Legislative Authority

- Original Act 96 of 1913,
- Act 8 of 1961
- “Hot off the Press”
  Latest Update: January 27, 2020

Rules Pertaining to Public Drinking Water Supplies

I. State Legislative Authority

- Latest Update: January 27, 2020

https://www.healthy.arkansas.gov/images/uploads/rules/PublicWaterSystemsFINAL.pdf

II. Purpose

"…..to ensure that all persons [served by a PWS] …..are provided with ample quantities of safe, palatable water which is compliant with the National Primary Drinking Water Standards."

(I have copies of NPDW Standards…)

III. Definitions

- In order to understand the Rules, the DEFINITIONS 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 all Public Water Systems in the State of Arkansas.

So, What is a Public Water System?

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

Types of Public Water Systems

- Community PWS
- Non-Community PWS
  - Transient
  - Non-Transient

Community PWS

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

Transient

Non-Community PWS

(Must Have an independent water source)

Any non-community water system that serves a transient population at least 60 days per year or a PWS that is used as a source for bottled water.

- Examples: rest areas, restaurants and camp grounds.

Non-Transient

Non-Community PWS

(Must Have an independent water source)

Serves at least 25 of the same individuals at least 180 days per year

- Examples: school, factory, water bottlers…etc

V. Drinking Water Quality…

Source water approval

- The quality of new or additional sources of water must be approved by the ADH before being made available for public use.

V. Drinking Water Quality…

Source water approval

- ADH must approve additional and new drinking water sources.
- Source water must meet National Primary Drinking Water Standards determined by the EPA.
- National secondary standards are also considered. Secondary standards are usually concerned with the aesthetics of the water. (examples: taste & odor-Sulphur, color-Iron, Mn).
- ADH will sample and test water to determine if the source qualifies.

V. Drinking Water Quality…

Source water selection

- Purest source should be selected
- Polluted sources 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

V. Drinking Water Quality…

- Drinking water must meet all National Primary Drinking Water Regulations.

V. Drinking Water Quality…

How are MCLs and MCLGs developed?

(MCLG= Max. Contaminant Level **Goal**)

The EPA:

- Identifies drinking water problems
- 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

VI. Health Dept. Authority as to Alterations and Changes to PWS's

Authority to Issue Orders

- 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. Alterations or Changes Required

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.

VII. Operation

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).

VII. Operation

Monitoring

Enables systems to determine if they follow regulations.

*daily, monthly, quarterly, etc.

VII. Operation

Records

- Reports such as analyses and operational records shall be submitted to the ADH by the **10th** day following the month of record.
- (For example, a July Report is due at ADH by Aug 10)
- Record Retention:
- Keep all correspondence and Records at least 3 Yrs.
- Bacti Reports, Engineering Reports, Compliance Correspondence- 5 Yrs
- Chemical Records, San Surveys, Lead & Copper Analyses, Corrosion Control Reports-10 Years
- Consumer Conf Reports- 12 Years, Plant Op Reports- For Ever

VII. Operation

Fluoridation: New Rule (2012): Ark SB 359:

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)

VII. Operation

Cross-Connection Program

- The owner shall institute a routine cross-connection program to locate and eliminate cross-connections. (Ordinance)

VII. Operation

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.

VII. Operation

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)

VII. Operation

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)

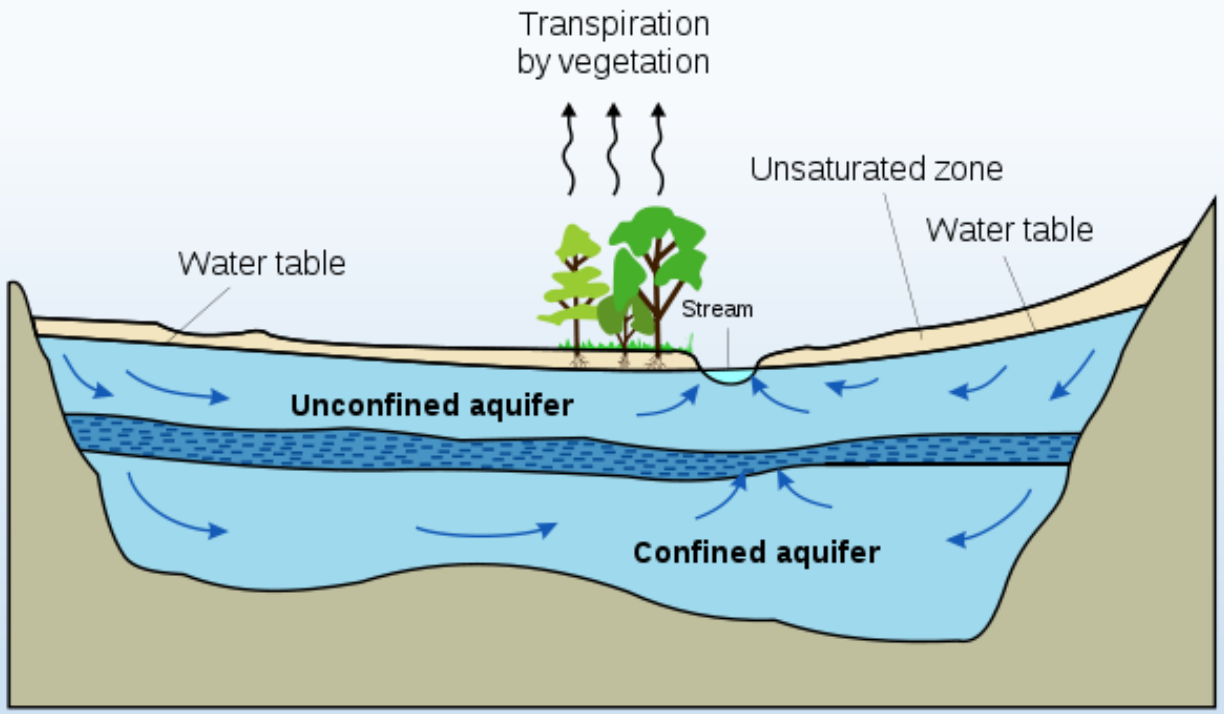
Constructing of New Systems & Modification of Existing Systems

- 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.


Transpiration
by vegetation
Unsaturated zone
Water table
Water table
Stream
Unconfined aquifer
Confined aquifer
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 macro-organisms, 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 .

VIII. GROUND WATER SUPPLIES

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.

VIII. GROUND WATER SUPPLIES

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.

VIII. GROUND WATER SUPPLIES

Proposed well sites

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

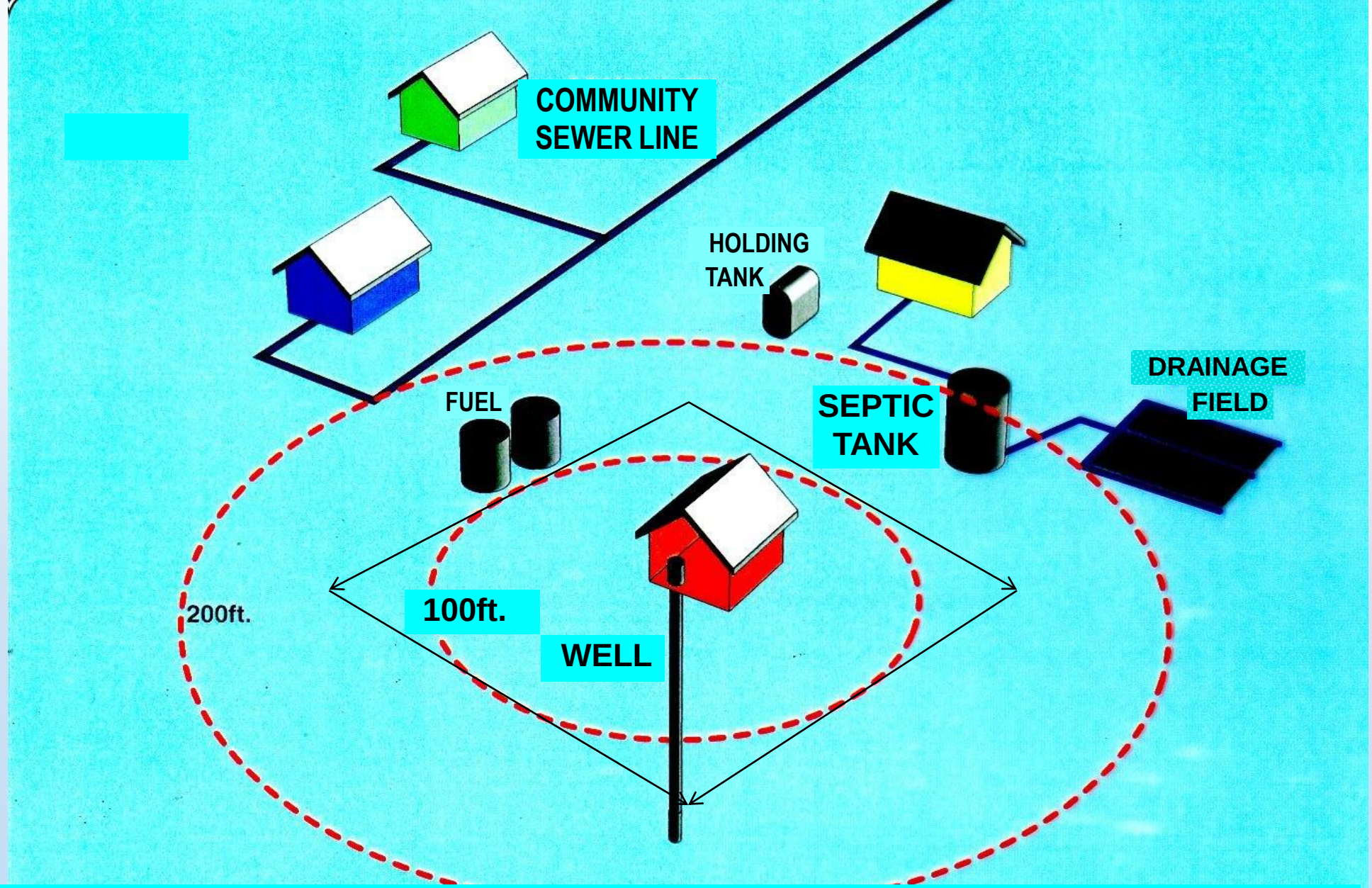
- Work First with ADH Geologists

VIII. GROUND WATER SUPPLIES

Restricted Wellhead Protection Zone

- 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.



Minimum Distance Between Wells and Pollution Sources

VIII. GROUND WATER SUPPLIES

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.

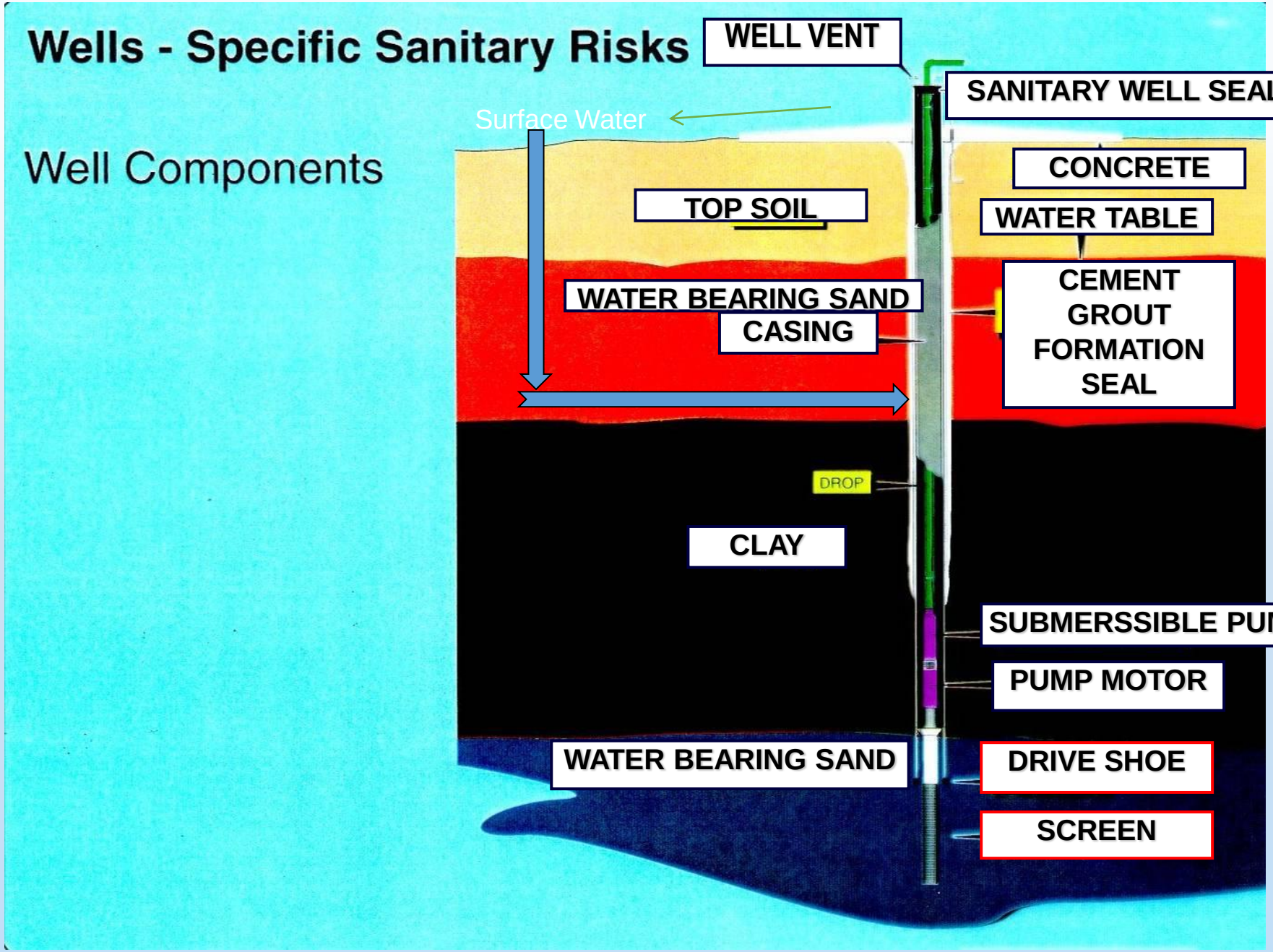
VIII. GROUND WATER SUPPLIES

Surface Protection

When required, the well must be protected at the surface by a water tight 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.

Wells - Specific Sanitary Risks

Well Components



VIII. GROUND WATER SUPPLIES

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.

VIII. GROUND WATER SUPPLIES

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

VIII. GROUND WATER SUPPLIES

Additional Well Abandonment Requirements

Arkansas Water Well Construction Commission

Rules 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

IX. SURFACE WATER SUPPLIES

IX. SURFACE WATER SUPPLIES

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.

IX. SURFACE WATER SUPPLIES

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

IX. SURFACE WATER SUPPLIES

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**.

IX. SURFACE WATER SUPPLIES

Restricted Intake Zone

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

IX. SURFACE WATER SUPPLIES

Filtration Required

Surface water sources and

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

X. WATER TREATMENT PLANTS

- 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 approved) shall be provided as required for an ADH- approved treatment process.

X. WATER TREATMENT PLANTS

- [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…)

X. WATER TREATMENT PLANTS

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

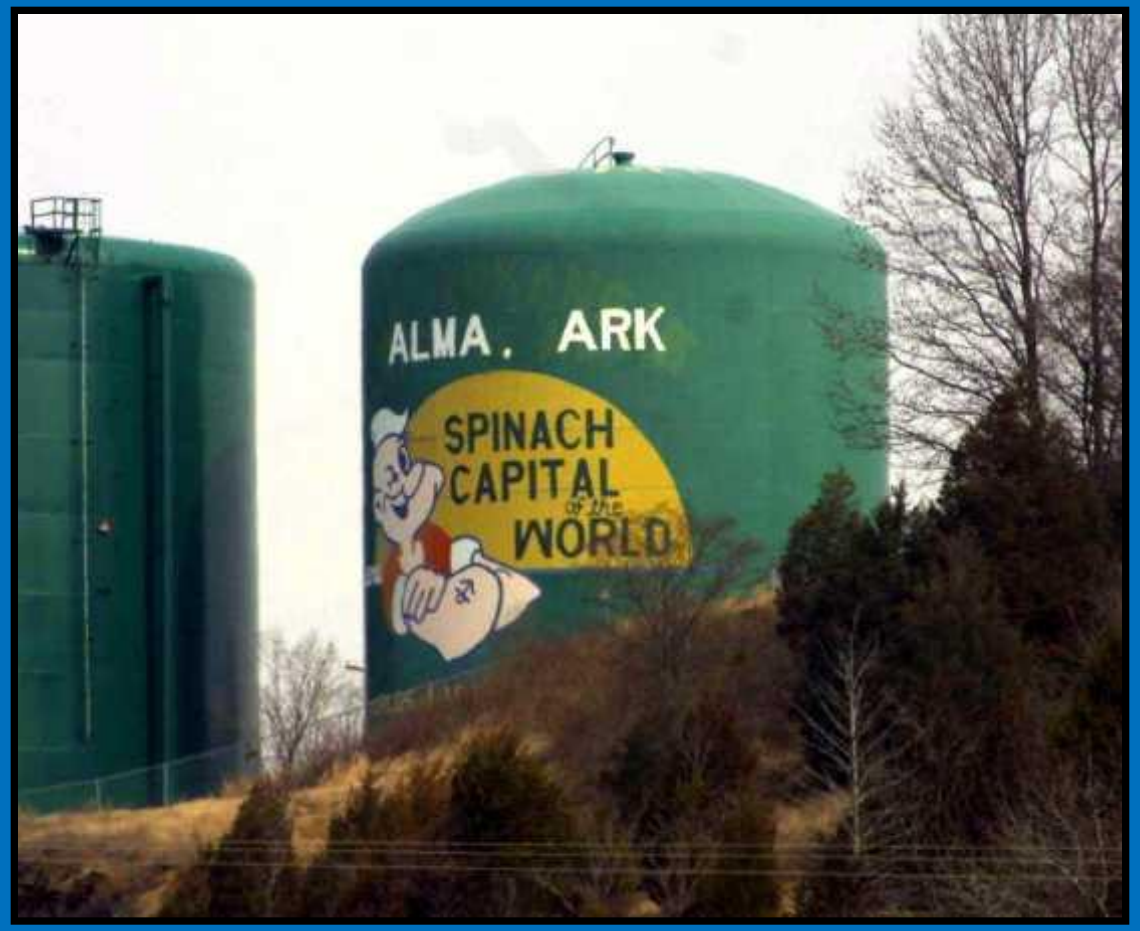
X. WATER TREATMENT PLANTS

- Laboratory:
  - lab facilities suitable for the accurate control [through various analyses] of the treatment processes.

    May require certification by ADH.

- Plant Maintenance:
  - Clean—daily removal of trash/debris accumulations
  - Surrounding grounds shall be maintained…

XI. POTABLE WATER STORAGE TANKS



XI. Storage Tanks

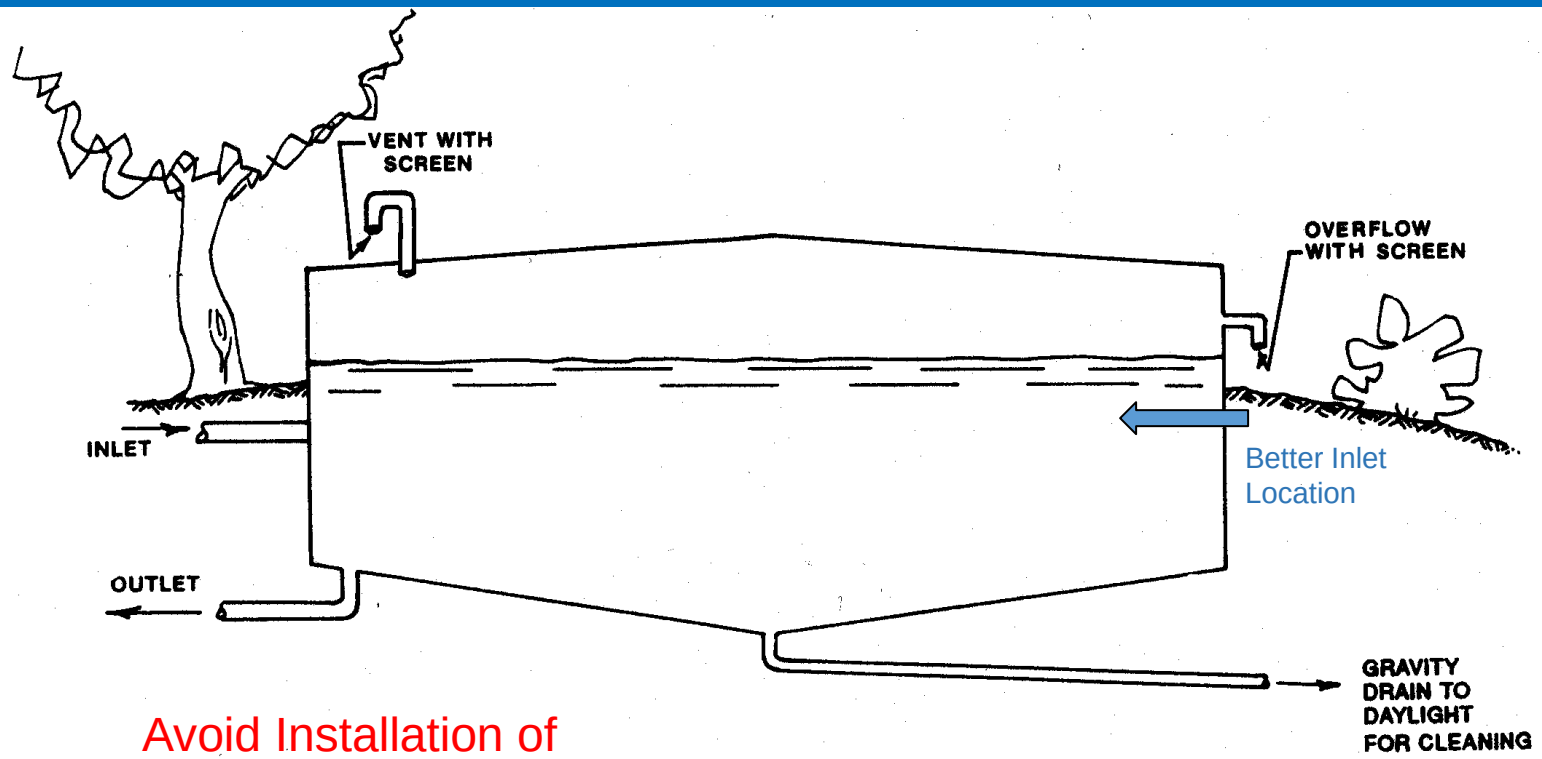
- Storage tanks shall be located above ground water level, unless approved by ADH, and be protected against flooding.
- Drainage [drains] shall not be connected to sewer or drain lines that could cause cross-connection backflow.

XI. Storage Tanks

- 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



Avoid Installation of In-the-Ground Tanks

Ground-level service storage reservoir

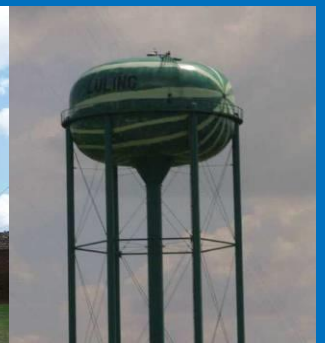
XI. Storage Tanks

Overflows

- Overflow pipes shall discharge freely at least 12 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)

XI. Storage Tanks

- 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.

XI. Storage Tanks

XI. Storage Tanks

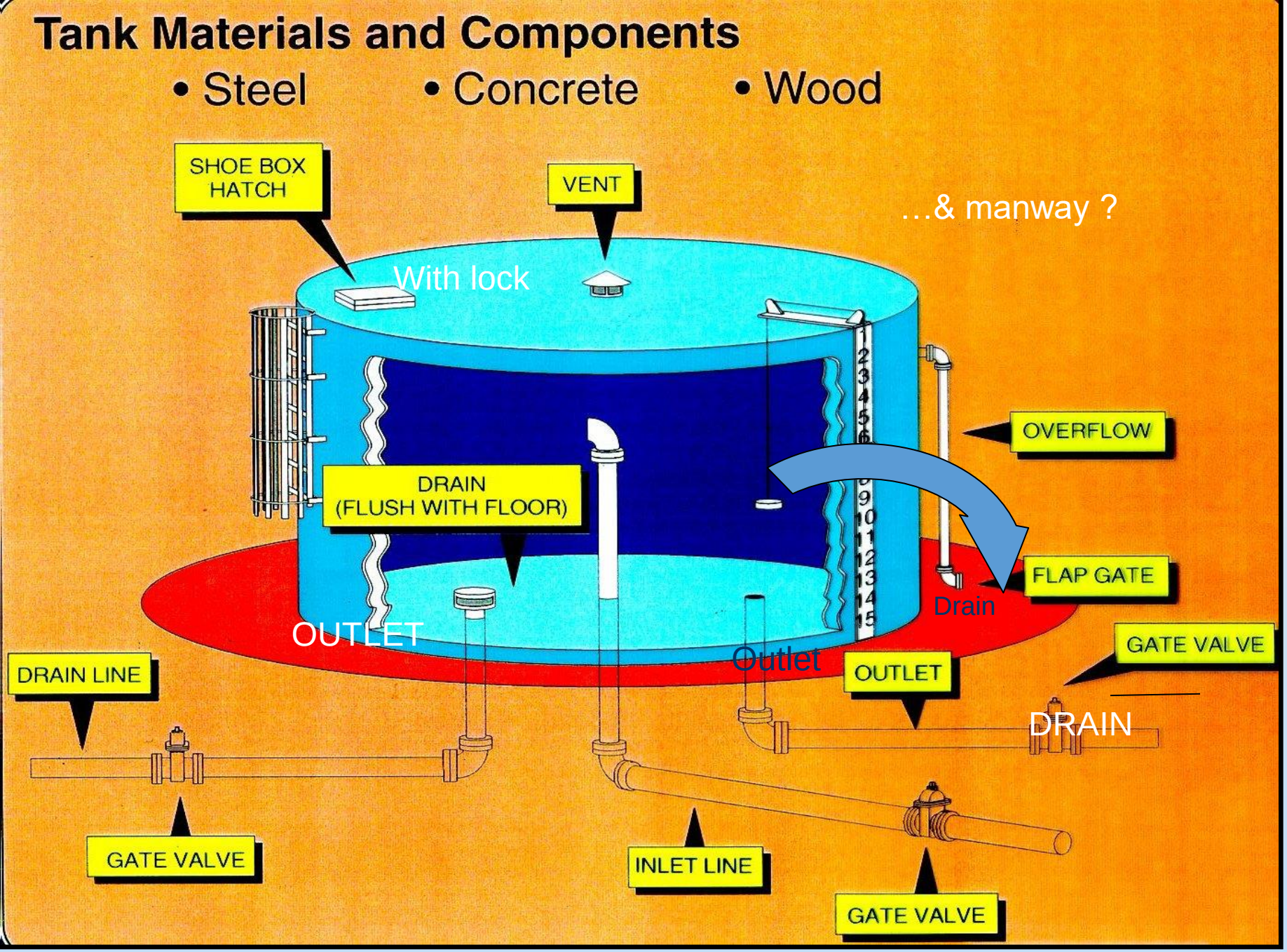
- All manway openings shall be provided with a sturdy locking device.

- All vents shall be provided with 24-mesh screen.

[Note:Need two Manways Above the Normal Full Water line]

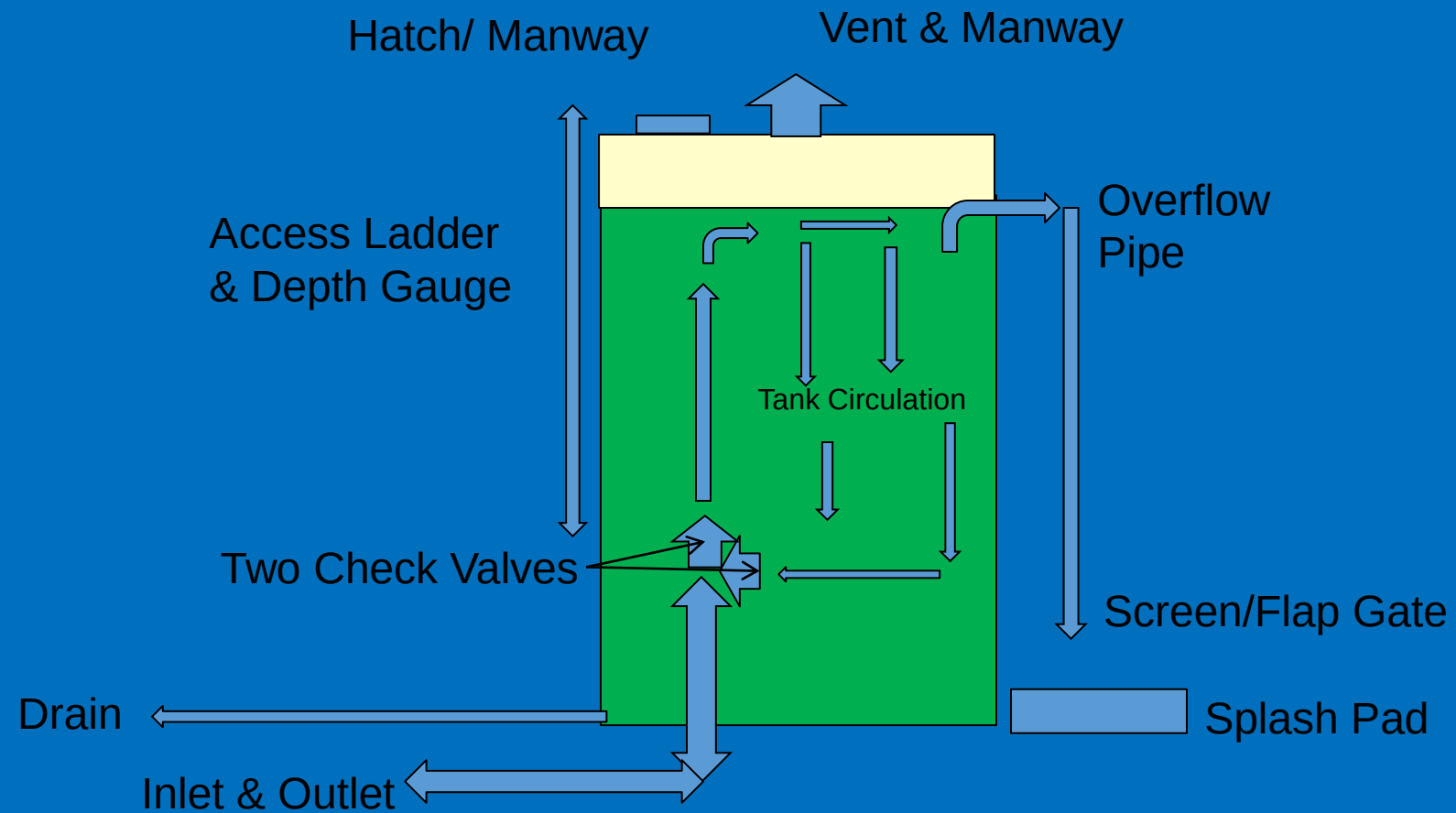
XI. Storage Tanks

- 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.


Tank Materials and Components
• Steel
• Concrete
• Wood
SHOE BOX HATCH
VENT
…& manway ?
With lock
OVERFLOW
DRAIN (FLUSH WITH FLOOR)
FLAP GATE
Drain
OUTLET
Outlet
GATE VALVE
DRAIN LINE
OUTLET
DRAIN
GATE VALVE
INLET LINE
GATE VALVE

Typical Tank Design…Considerations:

1) Hydraulics— Pressure & Flow requirements
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.

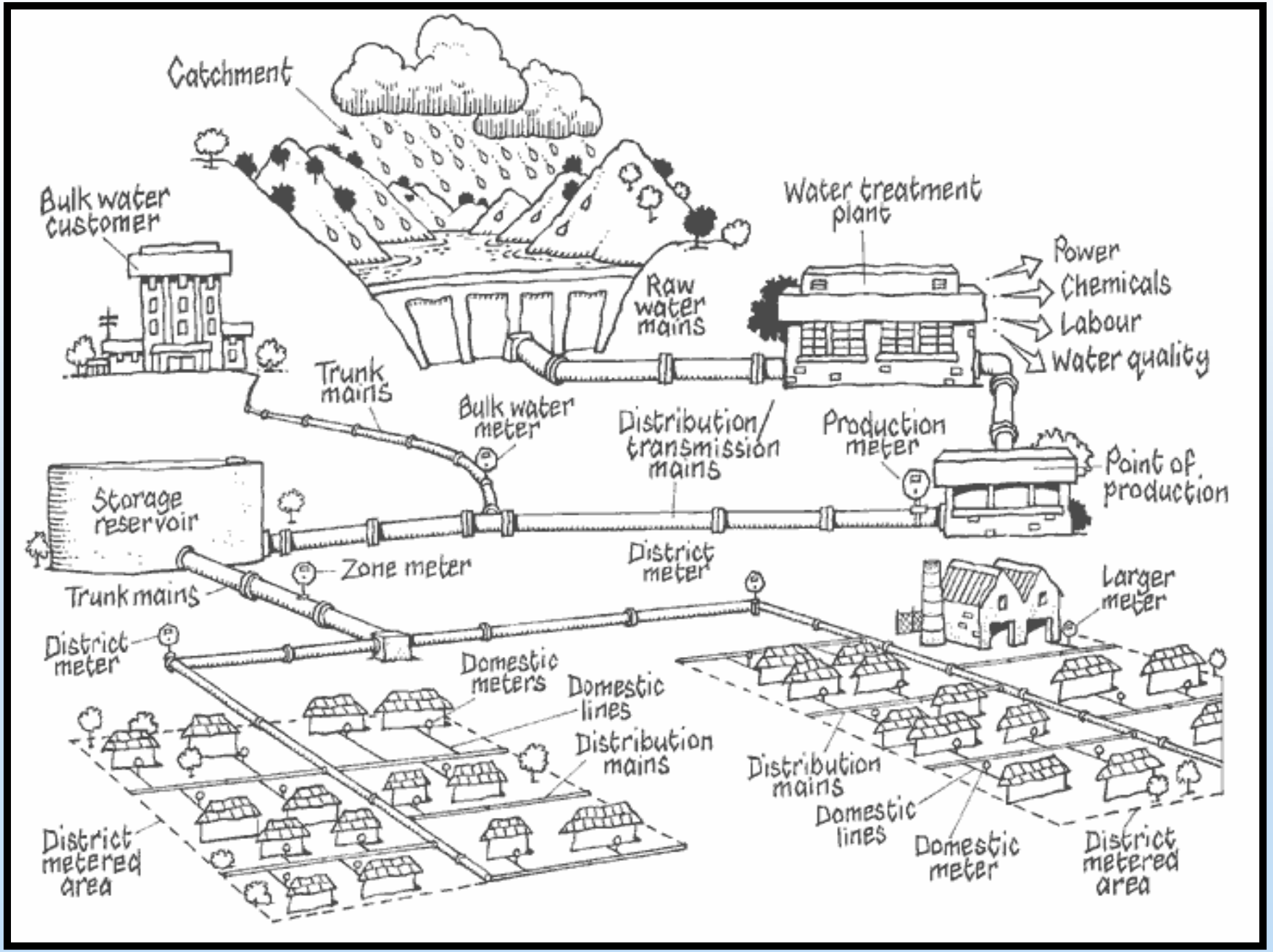
- Adequate residual of the disinfectant must be carried to all points throughout distribution system.

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 to AWWA and or “Ten States” standards and approved by the ADH.


Catchment
Bulk water customer
Water treatment plant
Power
Chemicals
Labour
Water quality
Raw water mains
Trunk mains
Bulk water meter
Distribution/ transmission mains
Production meter
Point of production
Storage reservoir
Zone meter
District meter
Trunk mains
Larger meter
District meter
Domestic meters
Domestic lines
Distribution mains
Distribution mains
Domestic lines
Domestic meter
District metered area
District metered area

Sanitary Hazards

Sanitary Hazards

- 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.

Sanitary Hazards

- 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.

Sanitary Hazards

- If the 18 inches must unavoidably be reduced, the water line or sewer line must be encased in water tight pipe with sealed water tight 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 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.

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

System Design

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

* Only emergency situations are the exception and you must notify the ADH

System Design

- 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.

System Design

Distribution Systems:

- 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.

System Design

Distribution Systems:

- 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

- All Public water systems in Arkansas are required by regulation to have a cross-connection control program in place after January 1, 1996.

- A Cross Connection 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.

XConn Contact:

Robert Reeves: 501-661-2623

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

- True and accurate reports of analysis and operational 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. licensed and certified
  D. debt free

C. Licensed and certified

- 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 long-range 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 water tight 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 (eg.—surface water, radiation bearing water, etc.)

D. To exclude the entrance of undesirable water

- All wells shall have a water tight slab or platform extending how far in all directions?

A. to the wall of the well house
B. 2 feet
C. no slab needed
D. 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. 50
  - B. 100
  - C. 300
  - D. 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

Or

email me at:

ADH.water.licensing@arkansas.gov