

Evaluation of Farm Water Systems



Chris Hylkema

NYS Dept. of Agriculture and Markets

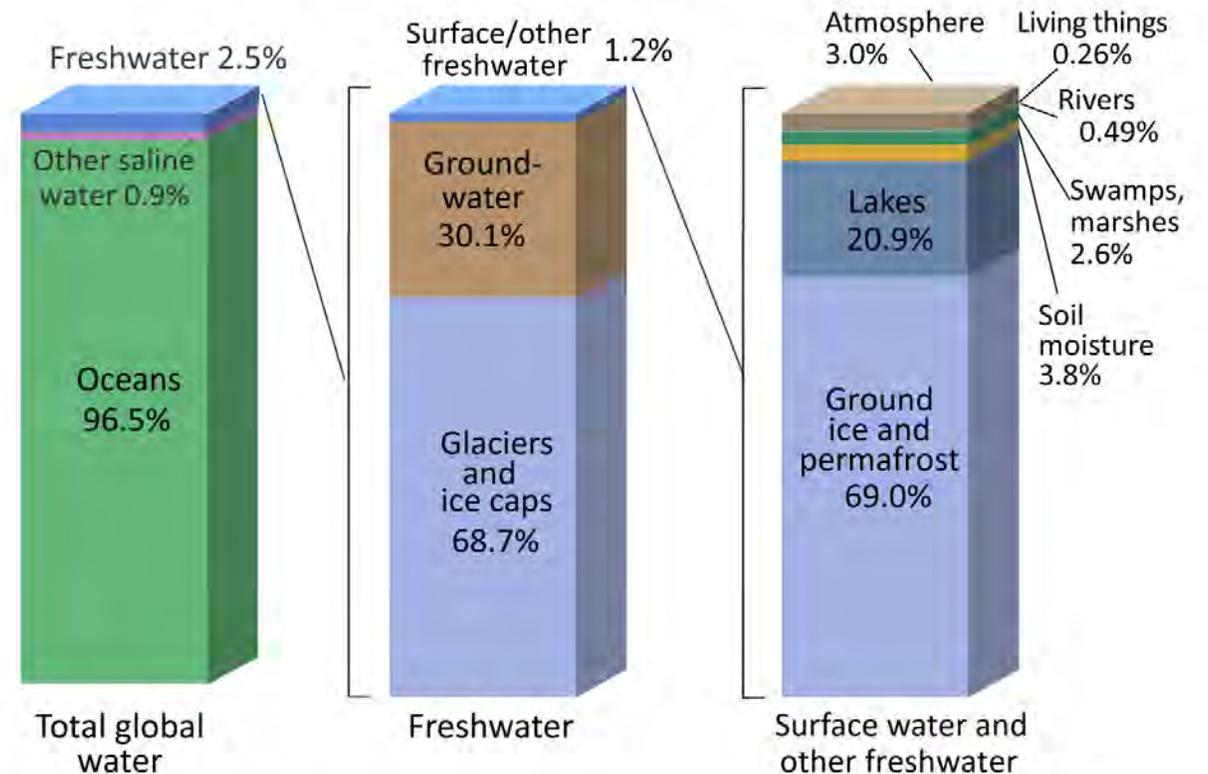
“I’m a dairy inspector, why do I spend so much of my inspection time evaluating water systems?”

- Every Dairy Inspector

Why be concerned about water?

Without a doubt, water is the most abundant resource on the planet. Approximately 72 percent of our planet is covered with water. The human race is crowded onto only slightly more than a quarter of our planet's surface, but without the water that consumes the rest of the space, the human race would perish. We require daily water for survival, our food is all grown with water and our bodies themselves are mostly comprised of water. Although water is prevalent on Earth, less than 10 percent of it is drinkable. The rest is salt water.

Where is Earth's Water?

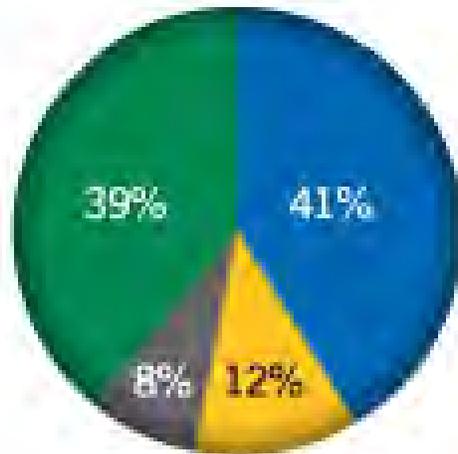


Credit: U.S. Geological Survey, Water Science School. <https://www.usgs.gov/special-topic/water-science-school>
Data source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources. (Numbers are rounded).

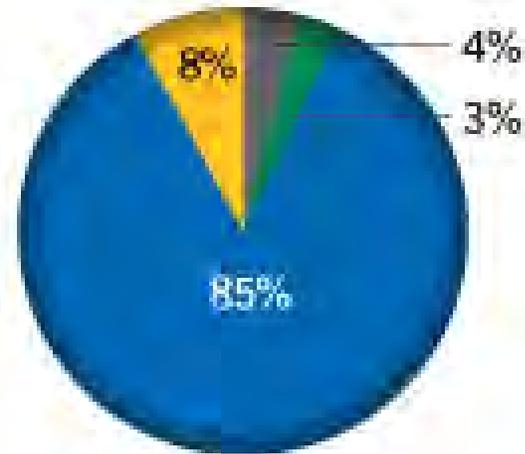
Agriculture uses a lot of water

UNITED STATES WATER WITHDRAWAL VS. CONSUMPTION

Water Withdrawal
340.7 billion gallons/day



Water Consumption
100 billion gallons/day



- Thermal Electric Power
- Irrigation & Livestock
- Domestic & Commercial
- Industrial & Mining

Source: United States Geological Survey, Cambridge Energy Research Associates.

Water Use Regulation

Drinking Water

- Federal - Environmental Protection Agency (EPA)
- State - Department of Health
- County - Dept. of Health

Grade A Milk Program

- FDA
- NYS Dept. of Agriculture and Markets
- Certified Milk
Inspectors representing industry cooperatives

State - Dept. of Environmental Conservation
– Pollution control, recreational water use

From the PMO

ITEM 8r. WATER SUPPLY

Water for milkhouse and milking operations shall be from a supply properly located, protected and operated and shall be easily accessible, adequate and of a safe, sanitary quality.

In other words -

The water supply has to be safe, there needs to be enough of it
and we need to protect it from contamination

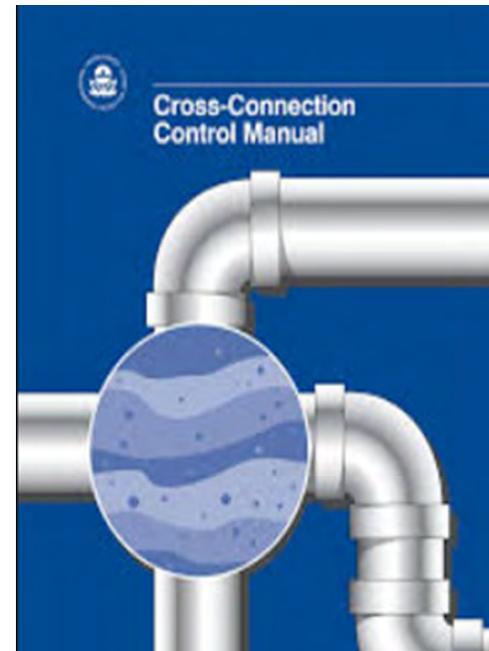
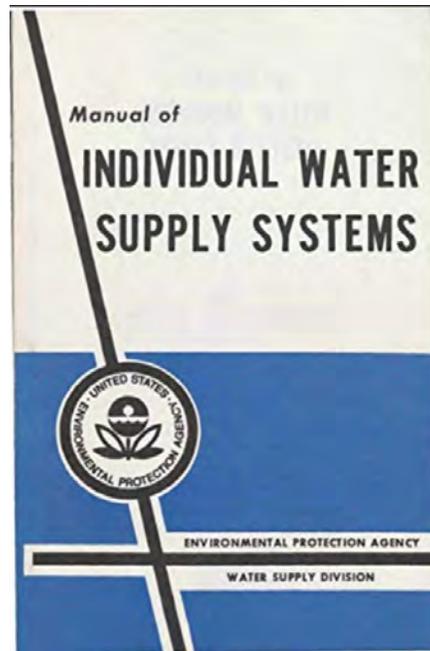
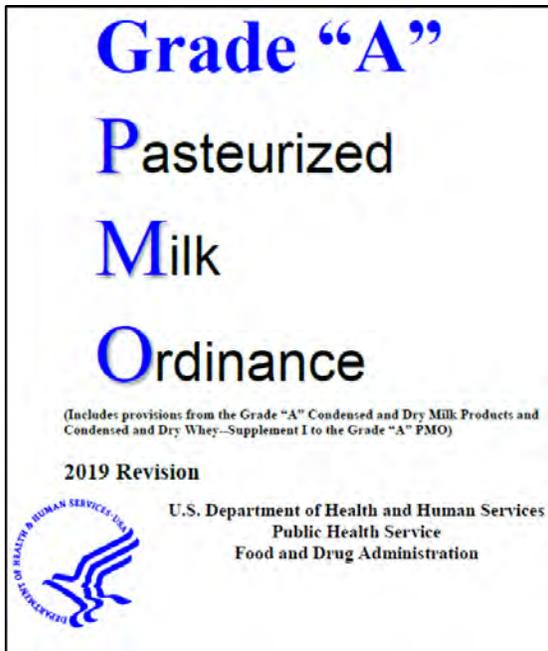
• Basic Regulatory Requirements

- PMO and EPA Manual of Individual Water Supply Systems

- Guidelines for water supply types
 - Groundwater and Surface Water
 - Reclaimed Water (PMO)
 - Protection of the supply

- EPA Cross Connection Manual

- Prevention of cross connections between a safe supply and an unsafe supply or other source of contamination



How do you turn this into something that you can evaluate and verify?



Water System Evaluation

- Do you have a procedure for evaluating water systems? Do you document your review in detail?
 - Brand new facility
 - Farm that you have been inspecting for years
 - Do you look at the system every time you go there? Is it really necessary to evaluate at every inspection? Have there been any modifications or repairs? ***How would you know?***
- Each system will be unique in some manner, but all must be evaluated for **proper construction, possible contamination sources, final use, any necessary BF prevention, required bacteria testing and in some cases, continuous disinfection**

Special thanks to Neil Reardon for his assistance

Water System Evaluation

- Where do you begin?
 - My suggestion - do not be concerned with the regulatory requirements at the start – break the system down



Are you a “read the directions and lay everything out” person or the “just pull each part out and figure out where it goes” person?

Simple Procedure for System Evaluation – *sort out all of the pieces*

- Identify the number of water sources, the location(s) and type(s).
 - Groundwater – type (well or spring)
 - Surface water
- Which source(s) will supply potable water for milk house use?



*Note on identifying the supply:
It's important to understand and
make the proper identification -
it may not always be that
straightforward – an example is
a “dug well” located on or near
the bank of a pond – it's most
likely that it's not actually a well
but rather a surface water
supply*



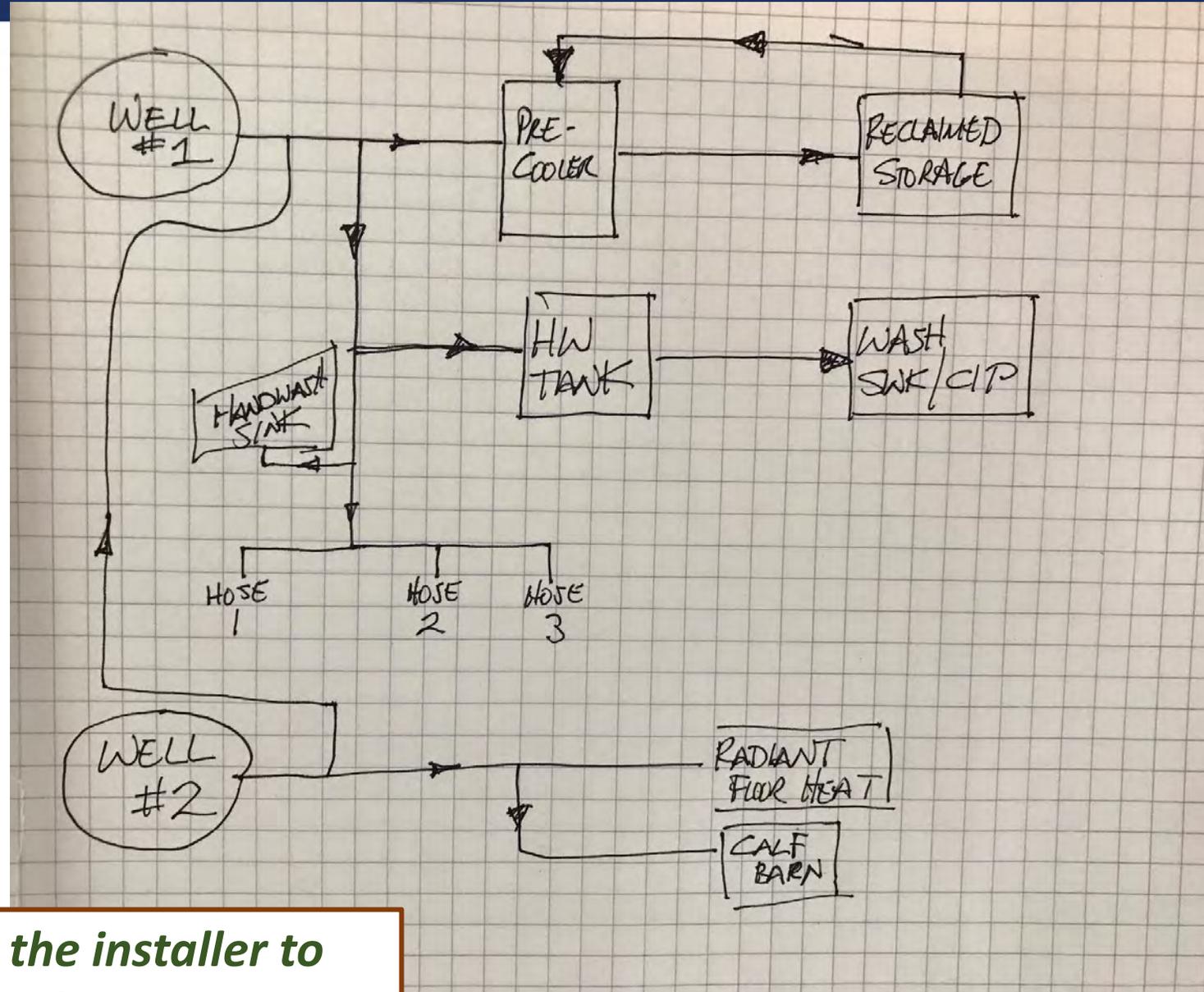
This is a situation where we can help – contact us and we can consult with you on making the correct determinations

- Make a list – where is the water used?
 - Example:
 - Well #1
 - Hot water tank
 - Precooler
 - Milk house wash sink / CIP
 - Milk house hand wash sink
 - 3 hose stations for various uses, wash down
 - Well #2
 - Radiant floor heating
 - Water to calf pen
 - 2nd Milk house supply if necessary



Complete a simple flow diagram

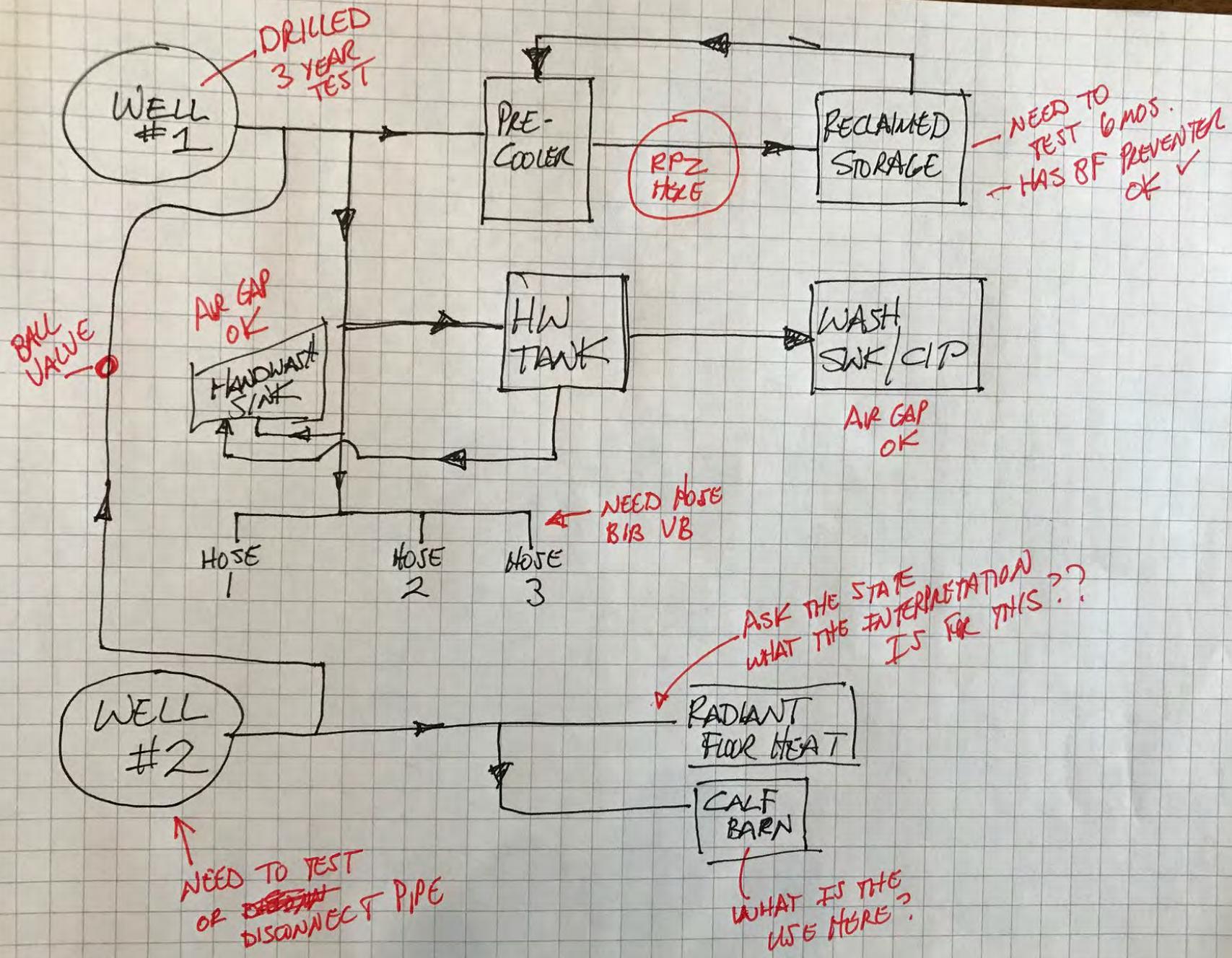
At this point don't worry about valves, BF prevention, testing or any requirements – just get the flow onto paper



On larger & new installations ask the installer to provide you with a plumbing schematic

- Once you know the supply, uses and basic flow ***now go back and apply your resources (i.e. the regulatory requirements)***
 - Assess each supply for compliance based on the requirements for that supply type
 - Example – Groundwater
 - Requirements for spring vs. drilled well vs. dug well
 - Example – Surface Water
 - Sanitary survey
 - Treatment
 - Filtration
 - Disinfection - chemical or UV
 - Monitoring – testing and record keeping

- After assessing the supply then evaluate the system for use and protection using your diagram:
 - Where is backflow protection required? Is the correct BF preventer installed at the point of use?
 - Are there any direct connections between potable and non-potable water sources? Is there a piping configuration available that would allow for a quick tie-in to a non-potable source – emergency water?
 - Is any water reclaimed for other uses?



Some components may need to get broken down further – some examples

- Reclaimed water
 - What is it being used for?
 - Does it require testing?
 - Proper backflow protection / overflow on storage tanks
- Treatment of surface water – chemicals, UV light
 - Will need to review monitoring of the system (testing and record keeping)
 - How is retention achieved with chlorine / what is the maintenance schedule for any UV light?
- Non-electric Farms
 - Protection of wells from gasoline (or other fuel) when using gas motors to run pumps

- In closing:
- Take complex systems and break everything down to its core
- Once you have it sketched out and made determinations for testing, backflow prevention, etc. - consider keeping a binder at the farm
 - In addition to sketches, take pictures or use tape marked with arrows to indicate direction of flow or positions of valves for wash vs. milking
- Having “as designed” documentation will help you down the road when changes are made





THANK
YOU!