

Three Common Drinking Water Problems on Dairy Farms

1 Watering Space & Management

- ✓ The most common “waterer” problems on dairy farms are: 1) inadequate number of waterers, 2) inadequate watering space, 3) poorly designed watering spaces, and 4) dirty waterers.
- ✓ Solution: 1) Provide ~2.0 linear feet of watering space per cow in return alleys from milking parlor (e.g., 40 ft of watering space for a D-20). Warm plate cooler water is a good source for this water since cows prefer to drink warm water. Remember, milk is ~87% water and cows may drink as much as 50-60% of their total daily water intake immediately after milking if given the opportunity, 2) Provide a minimum of 3 inches of waterer space per cow in cow housing, 3) Provide a minimum of two water sources per group in cow housing, 4) Cows should never have to walk more than 50 ft to get a drink of water, 5) Water sources should be close to feed bunks, 6) Water sources should be protected from direct sunlight, 7) Crossover alleys containing water troughs should be at least 13.5 ft wide to allow adequate watering and walking space, 8) Keep waters clean (Test: would you drink from it? If “no,” then clean it!), 8) Don’t locate waterers where boss cows can prevent other cows from getting adequate water.

2 Excess Iron

- ✓ Test your water and if it contains over 0.3 ppm (milligrams/liter) of iron (Fe) your cows may suffer from iron toxicity causing increased health problems and reduced milk production.
- ✓ Solution: A good solution is a hydrogen peroxide injection/filtration system that converts ferrous iron (very soluble and reactive) to ferric iron and then filters out the ferric iron. Chlorination and filtration also will remove reactive iron.

3 Excess Sulfate & Chlorine

- ✓ Test your water and if it contains over 500 ppm of total dissolved solids (TDS) you may have a sulfate and chloride problem with your water.
- ✓ If the sum of the concentrations of sulfate and chloride in your cow’s drinking water is greater than 500 ppm it may be adversely affecting water consumption, cow health, and milk production (best to have sulfate + chlorine less than 250 ppm).
- ✓ Solution: Best solution is to find an alternate water source without the sulfate + chlorine problem. There are other more costly solutions like reverse osmosis (RO) and ion exchange systems (e.g., water softeners) that might work depending on the size of the problem, the treatment application, and the cost.

Get Your Water Tested! Take two samples: one at the well head and one as near as possible to the waterers.

- ✓ County Health Departments usually supply free water sample bottles and can advise you on testing your water. Huron County, 989-269-9721 (ext. 148); Lapeer County, 810-667-0392; St. Clair County, 810-987-5300; Sanilac County, 810-648-4098; Tuscola County, 989-673-8114 (ext. 129). You can also go to the Michigan Department of Environmental Quality web site (www.michigan.gov/deq/) to get a directory of water testing labs. Go to the MDEQ site and search for “water testing laboratories.” The top search item is the MDEQ water testing lab directory.
- ✓ Midwest Laboratories¹ (13611 ‘B’ Street, Omaha, Nebraska 68144-3693; Tel: 402-334-7770, Fax: 402-334-9121; <https://www.midwestlabs.com>) offers a “Livestock Suitability” (W1) water test that includes: sodium, calcium, magnesium, chloride, conductivity, sulfate, nitrate nitrogen, pH, iron, copper, and total dissolved solids. Current cost (as of 12/1/12) of the test is \$43.00. You may order a kit from their e-store containing sampling supplies and a UPS prepaid shipping container (SKU16136; \$50).

¹Other labs can provide similar services. This information is simply provided as an example of the type of service dairy producers and their consultants should consider to aid in improving water nutrition of their cattle. The lab is listed as an example and is not recommended over other certified labs that provide comparable services at comparable prices.

Dairy Farm Drinking Water Analysis

1. Take a water sample. For guidelines on how to take drinking water samples and standard water analysis refer to: www.msu.edu/~beede/, click on Extension and then “Taking a Water Sample.”
2. It is recommended to take at least two samples; one near the wellhead and one after the storage or reserve tank; these laboratory results should be compared.
3. Have your water analyzed via standard laboratory analyses for “livestock suitability” by a certified laboratory.
4. If the laboratory reports concentrations greater than the “retest” or “actionable” levels in the table below, take two more samples and send each to a different certified laboratory for analyses. This may seem like over-kill, but water treatment systems are a major investment, so it is important to know for sure that concentrations are in excess.
5. If one or more of these constituents are in excess, contact at least two water treatment companies and ask about their treatment methods, and if and how they remove or reduce the offending constituent(s).
6. After a treatment system is installed, take treated water samples at least every month, label and tightly seal them (to stop possible evaporation), and store in a cool place for historical purposes. At least every third month send a sample to a certified laboratory for a standard “livestock suitability” analysis, including iron, sulfate and chloride. Is the water-treatment system removing or reducing the constituents as expected and guaranteed?

Actionable levels of important water constituents.

| Constituent | Retest Level | Actionable Level |
|---|---------------------|-------------------------|
| Total Dissolved Solids (TDS) | >500 ppm | >5,000 ppm |
| Sulfate (SO ₄), + Chloride (Cl) | >250 ppm | >500 ppm |
| Nitrate-nitrogen (NO ₃ -N) | >10 ppm | >20 ppm |
| Iron (Fe) | >0.15 ppm | >0.3 ppm |
| pH | <6.5 or >8.0 | <6.5 or >8.5 |

*Did you know a milking cow can consume 35-50 gallons of water per day?
And, heat stress can nearly double water consumption!*

Questions to ask sales and service representatives from prospective water-treatment companies.

1. Do you know how much water this particular dairy uses? The company representative will not know this, but you’ve got to know the answer to this question! Most dairies use a lot of water¹; often much more than companies are accustomed to treating at a single location. What is the treatment rate (volume/time)? Can their system supply enough water for all uses on the dairy simultaneously during peak usage (e.g., during milking, parlor clean-up and when cows are drinking)? Will a sizable investment in large long-term storage of the treated water be necessary to ensure you have ample supply during peak usages?
2. Does each company guarantee their system will remove or reduce the offending constituent to acceptable levels? Are they willing to provide a written guarantee their system will perform throughout the life of the treatment system?
3. How long will the systems last and how much maintenance is required? Who does the maintenance --- you or them? Do they have “service-after-the-sale” and what does that include? Is a maintenance contract available?
4. Which other anti-quality factors (besides iron, sulfate, and chloride) do their water treatment systems address? There may be none. But, there also may be additional benefits to one treatment system over another if other constituents are in excess in your water.
5. What chemicals (e.g., other mineral elements) does their treatment method add to the water and what will be their concentrations? There may be nothing added. But, in some cases things may be added (e.g., chlorine).
6. What does the system cost? What are the installation costs, operating costs, and maintenance costs?

¹Send me an e-mail (thomasc@anr.msu.edu) to obtain an Excel[®] spreadsheet for estimating total water usage on your dairy farm.