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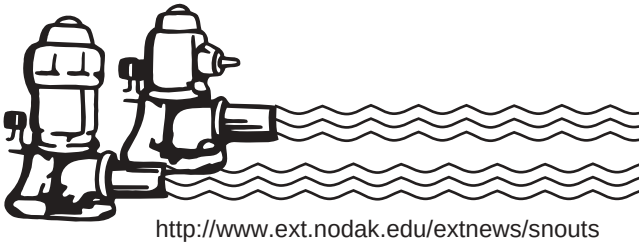

water spouts

No. 207 OCTOBER 2003

http://www.ext.nodak.edu/extnews/snouts

Enclosed is a form with prepaid return postage asking for your preference on how to receive future copies of *Water Spouts*. We need to update our mail list, so please take the time to look at the form and fill it out and return it to us. This is the final issue of Water Spouts for 2003. Copies of Water Spouts are available at this Web address: *www.ext.nodak.edu/extnews/snouts/* .

Upcoming Irrigation Workshops

Nov. 20, Thursday **New Town**

This workshop is for new irrigators in the western part of the state and will cover topics fundamental to irrigation management. Contact person is Paul Gjermundson, Extension agriculture agent, Fort Berthold (701) 627-3446.

Nov. 25, Tuesday **Carrington Research Extension Center**

This workshop is for new and potential irrigators. The topics covered focus on the basics of getting into irrigation. Water sources, water and soil quality, water permits, financing options, irrigation economics, basic irrigation water management and an introduction to common irrigation equipment are some of the presentations.

Dec. 4, Thursday **Best Western Ramkota Hotel, Bismarck**

This workshop is for experienced irrigators and will cover improved irrigation management options as well as developments in irrigation. This workshop is held in conjunction with the North Dakota Water Users annual convention scheduled for Dec. 3 and 4 at the Radisson Inn, Bismarck. The Missouri Slope Irrigation Development Association (MSIDA), the NDSU Extension Service and the North Dakota Water Users sponsor this workshop. As part of the convention, there will be an exposition where irrigation suppliers demonstrate their products and services.

Jan. 6, Tuesday **Ernie French Center, Williston RE Center**

This workshop is for current irrigators. Topics covered may include conversion from surface irrigation to center pivots, irrigation financing options, chemigation, irrigation water management (scheduling/timing), irrigated crop rotations, irrigation economics, disease/weed/insect control, variety considerations and fertilization timing. Contact person is Chet Hill, Extension value-added specialist, Williston (701) 774-4315.

More information about the workshops will be mailed in November. An application for Certified Crop Advisor (CCA) CEUs will be made for each workshop. If you have any suggestions for topics to cover at the workshops, please give me a call; send an e-mail or a letter.

New Extension Irrigation Development Agent

Ramsey County Extension Agent Mike Liane has assumed a new position as Extension Irrigation Agent. Mike has been with NDSU for 25 years having served for two years at the NDSU Animal Research Center, six years as the reservation agent at Fort Totten, six years as Benson County Agent and 11 years as Ramsey County Agent.

The irrigation agent position will focus on the promotion of irrigation in North Dakota with emphasis on working with existing irrigation districts and in the development of new districts. Mike will be working closely with Tom Scherer, Extension Water Quality/ Irrigation Specialist, with the development and coordination of irrigation programs across the state and will also be working with Rudy Radke, High Value Crop Specialist,and Chet Hill, Value-Added Specialist in Williston, on a variety of programs, field tours and research projects. He will also be working with the irrigation caucus and the commercial vegetable and high-value crop groups.

In addition, Mike will have a 15 percent appointment to the NDSU Extension Pesticide Program and will be involved in conducting commercial pesticide training across North Dakota.

This position is funded through the NDSU Extension Service, Garrison Diversion Conservancy District, Bureau of Reclamation and the NDSU Pesticide Program. Mike's office will be in the Devils Lake Area Extension Office. He can be reached at (701) 662-1364 or by e-mail at *mliane@ndsuext.nodak.edu*.

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"EQIP" Yourself to Enhance Ground and Surface Water

The Environmental Quality Incentives Program (EQIP) provides irrigators the opportunity to conserve their water resource. The program provides financial and technical assistance for individuals to implement water saving conservation practices within their irrigation management system.

Producers interested in employing water conservation changes within their current water delivery system; for example, from high-pressure sprinkler to a low-pressure sprinkler system; may be eligible for reimbursement of up to 50 percent of the cost on a cost-per-acre basis. In addition, producers who choose to convert their current delivery system to a more water efficient delivery system; for example, flood irrigation to sprinkler; may also be eligible for cost-share. The program also offers incentives to producers who make changes in their irrigation water management by developing and implementing an irrigation water management plan.

Please contact the Natural Resources Conservation Service (NRCS) at your local USDA Service Center if you are interested in applying for EQIP. Additional information is available at *www.nd.nrcs.usda.gov* under *Programs.*

Jennifer Heglund (701) 530-2095
Assistant State Conservationist, Programs
Jennifer.heglund@nd.usda.gov

Fall Chlorination – Every Irrigation Well Needs It

When the water source is groundwater, the well is the heart of the irrigation system. Most groundwater in North Dakota contains small amounts of iron, which provide energy for the growth and development of iron bacteria. These bacteria form a slimy, gelatinous mass on the well screen, casing and pump and in the aquifer surrounding the well screen. If your irrigation equipment has a rust color or the water has a rotten egg smell, then growth of iron bacteria in the well is a good possibility.

As iron bacteria spread in the well, they reduce the amount of open area of the screen and the open area of the spaces in the aquifer formation, thus reducing the well yield. Reduced well yield will affect the operation of the irrigation system and could reduce yields, especially with high-value crops like potatoes. The only way to effectively control iron bacteria is by chlorinating the well on an annual basis.

Well chlorination should be performed at least once per year, but some wells may need it in the spring and the fall. The object of well chlorination is to raise the chlorine level in the well to 500 parts per million (ppm) and hold it there for a period of time to allow the chlorine to attack and kill the bacteria. It is especially important to also get the chlorine out into the aquifer material surrounding the well screen, Figure 1.

The two common sources of chlorine used in well chlorination are household bleach that contains about 6 percent chlorine and a dry form of calcium hypochlorite sometimes called HTH. HTH contains about 70 percent available chlorine and can be purchased from swimming pool companies, well drillers and some irrigation dealers. I recommend using common household bleach for a couple of reasons. Chlorine is a noxious and dangerous gas. Household bleach is the safest form of chlorine to handle because of its low level of chlorine. Second, it is easy to obtain as almost all grocery and convenience stores have it in stock.

Irrigators with oil-lubricated, deep-well turbine pumps should be especially careful if they use HTH to chlorinate their wells. It is common for these wells to have a layer of oil on top of the water. Mixing chlorine and oil can have explosive repercussions, therefore if a granulated or pellet form of chlorine is used for chlorination, please mix it with a suitable amount of water before pouring into the well.

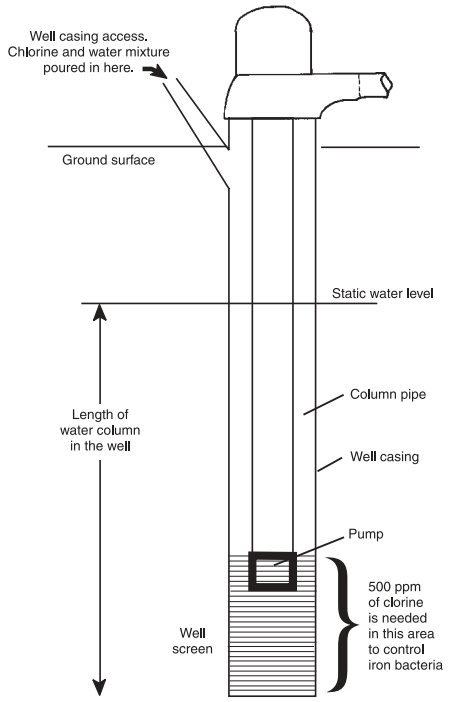

Figure 1. Annual chlorination of a well is needed to control iron bacteria.

It is important to chlorinate the well before you pump out your pipelines for the winter. Use the following procedure to chlorinate your well(s):

1. Determine the depth of water standing in the well. This is the total well depth minus the depth to static water.
2. From Table 1, determine the amount of chlorine needed. For example, if you have a 12-inch diameter well 100 feet deep and the static water level is at 20 feet, the column of water is 80 feet deep. The amount of chlorine bleach needed is 8 x 0.6 gal/10 ft. or 4.8 gallons (use 5 gallons). The amount of HTH needed would be 8 x 0.35 pounds/10 ft. or 2.8 pounds.
3. Introduce the chlorine into the well using one of the following methods. Use protective gloves and goggles. Chlorine solutions this strong can cause skin burns.
   a. When using HTH **pellets**, drop through the casing access hole to the bottom of the well (with oil-lubricated turbines do this very slowly).
   b. When using HTH **granules or powder**, dissolve slowly by adding to 10 gallons of water or more. Pour into the well then add at least 100 gallons of water to distribute throughout the well.
   c. When using liquid bleach, mix with 10 or more gallons of water and pour into the well. Add at least 100 gallons of water to distribute throughout the well.
4. Wait at least four hours.
5. Surge the water in the well by starting and stopping the pump. Don't allow the water to discharge from the well. This action is called "rawhiding" a well. Do this at least four times. For deep well turbine pumps with electric motors, allow five minutes between starts to allow the water to flow back into the well.

Table 1. Quantities of chlorine material to use for each 10 feet of water in the irrigation well.

Well Diameter	Gallons of Water in a 10-ft column	HTH 70% Chlorine	Bleach 5% Chlorine
(inches)		(pounds/10 ft)	(gallons/10 ft)
6	15	0.1	0.1
8	26	0.16	0.2
10	41	0.35	0.6
14	80	0.5	0.8
16	105	0.6	1.0
18	133	0.8	1.2
20	164	1.0	1.5
24	235	1.4	2.2

6. Force the chlorine into the aquifer by pouring in at least 100 gallons of water.
7. **Let the chlorine stand in the well for 24 hours. Chlorine needs time to kill iron bacteria.**
8. Surge the well at least four more times, then pump the water to waste. This water can be pumped through the irrigation system. In fact, it will help clean out pipelines and spray nozzles. Stand upwind because the chlorine smell could be strong. Pump until the odor of chlorine is gone.

By chlorinating your well on a consistent basis, the production of the well should stay close to when it was drilled.

Is Your Irrigation System Ready for Winter?

Irrigation systems, just like other farm equipment, need regular, routine maintenance, especially when most of the equipment stays outdoors all year. Performing the following maintenance items will help ensure your irrigation equipment is in good shape when you start it next spring.

Pumps and pipelines

Pipelines, valves, tanks, centrifugal pumps, etc. should be drained of water or pumped out before Nov. 15 to prevent damage from freezing.

If the pipeline has any air relief valves located at high points, check to make sure the air relief valve is not stuck before draining the pipeline. Often the plastic ball in the valve will stick shut, which will prevent water from draining out of the pipeline. Much like when a full liter bottle of soda is held upside down, only so much drains out before air has to enter the bottle. Making sure the air relief valves are not stuck will help the pipeline drain faster.

After the water has been pumped out, the pipeline should be checked several days later and pumped out again. Often, more water will drain to the pump-out location. Last year, we had very little snow and many pipes that weren't pumped a second time were frozen. This caused many problems at startup this spring. Protect pump-out risers and other equipment from livestock. Close or cover any openings that might invite animals or rodents to enter.

For oil-lubricated, deep-well turbine pumps, let some oil drip into the line shaft bearings when the pump is cold. Rotate the shaft to distribute the oil over the entire bearing. The cold oil will adhere to the cold bearings and provide good winter protection. Check the packing gland around the shaft on the pump head; if it is worn or missing pieces, replace with new material. On belt-driven pumps, remove the belts and store in a dry place. If you can't remove the belts easily, then reduce the tension on the belts. If the belts are worn or frayed, replace with new belts in the spring.

Accurate pressure gauges and flow meters are the best way to keep track of the performance of your irrigation pumping system. If possible, remove the flow meter and pressure gauges. Cover or plug the holes. If the flow meter does not work, winter is a good time to have it repaired. Note any broken pressure gauges and replace with new ones in the spring.

Above-ground pipelines and gaskets

Pipes should be stored on racks so that one end is above the ground to permit drainage and air circulation. Protect them from livestock.

Gaskets are an extremely important part of aboveground pipelines (including gated pipe). Flow testing in Nebraska showed that many aboveground pipelines lost from 10 to 35 percent of the pumped water between the pump and the irrigation system. Cracks and other leaks in the pipelines accounted for some of the lost water, but most of the water was lost due to old or missing gaskets.

If possible, remove the gaskets when storing pipe for winter. Inspect them and obtain replacements for any that are damaged or which leaked during use. Store the gaskets in clean water in a place that will not freeze. This prevents them from cracking and drying out. **Do not** hang gaskets on a nail or hook. If they cannot be stored in water, place them over a pipe that has a slightly smaller diameter than the gasket and keep out of direct sunlight. Covering the gaskets to restrict air movement will also help prevent drying out and cracking. If the pipe is to remain in the field, loosen the connectors but don't split all the sections of pipe (some may need to be split to drain water). In the spring, make sure the gaskets are in good condition before inserting in the pipeline.

Chemical injector pumps

Chemical injector pumps should be flushed with water, drained and, if transportable, stored in a clean dry place. If the pump is belt driven, loosen the belt.

Electrical motors and controls

Check all electric motor openings to make sure they are properly screened to keep rodents out. Rodents like to chew on motor winding insulation in the winter. Often, chewed windings result in shorts and a burned out motor the next year. If a screen is damaged or missing, replace with quarter-inch mesh screen. This screen can then be left in place during operation without plugging with dust and debris. Electric motors are best left open to free air movement to keep moisture condensation in the motor to a minimum. Lubricate all bearings and rotate motor. Change oil in the motor reservoir if discolored.

On electrical control panel doors, replace hard or broken seals to keep moisture, dust and rodents out. Seal all openings into the electrical control box to prevent rodents from entering and damaging the wiring. Lock the control box in the "OFF" position. Spraying electrical contacts with contact cleaner will displace dirt and moisture to prevent corrosion.

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