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water spouts

No. 226 OCTOBER 2006

Mark Your Calendar for These Irrigation Workshops

Dec. 7, 2006 – Bismarck Best Western Ramkota Hotel

This workshop will be held in conjunction with the North Dakota Water Users annual convention. The Missouri Slope Irrigation Development Association, NDSU Extension Service and North Dakota Water Users sponsor this workshop. The convention will include an irrigation exposition where suppliers demonstrate their products and services.

Topics covered will include an update on the irrigation EQIP program, center pivot wheel track management, site-specific water application technology, remote monitoring and control of center pivots. The afternoon session on corn production for ethanol will include corn breeding and genetics, management of irrigated corn, feeding ethanol byproducts to beef cattle and selling corn to ethanol plants.

Dec. 19, 2006 – Beulah

This will be a half-day workshop, starting at 10 a.m., that includes a lunch. It is for people who might be considering developing irrigation on their property. Topics covered will include the requirements for obtaining an irrigation water permit, status of water resources in the area, water quantity/quality requirements, suitable soils, financing options, pumping power requirements and corn varieties for ethanol production. Contact is Mike Liane, (701) 662-1364, mliane@ndsuext.nodak.edu

Jan. 3, 2007 – Sidney, Mont.

The Montana State University Extension Service and North Dakota State University Extension Service will host this workshop jointly. It will be at the Agricultural Research Service's Northern Plains Agricultural Research Laboratory, 1500 Central Ave. N., Sidney. Contact person is Chet Hill, Extension area value-added specialist, Williston, (701) 774-4315 chill@ndsuext.nodak.edu

Jan. 11, 2007 – Park River

This workshop is being held because of the interest in irrigation in the surrounding area and Devils Lake. Contact is Mike Liane, (701) 662-1364, mliane@ndsuext.nodak.edu

More information about the workshops will be mailed later. If you have any suggestions for topics to cover at the workshops, please give me a call or send an e-mail or letter.

Now is the Time to Chlorinate the Irrigation Well

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 provides 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 spaces in the aquifer formation, thus reducing the well yield. During a drought, reduced well yield will affect the operation of the irrigation system and increase energy costs, and could reduce yields. 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 fall. The object of well chlorination is to raise the chlorine level in the well to 500 parts per million and hold it there for a period of time to allow the chlorine to attack and kill the bacteria. Getting the chlorine out into the aquifer material surrounding the well screen is especially important, Figure 1 (page 2).

The two common sources of chlorine used in well chlorination are household bleach, with about 6 percent chlorine, and a dry form of calcium hypochlorite sometimes called HTH. HTH contains about 65 percent available chlorine and can be purchased from swimming

NDSU Extension Service North Dakota State University

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pool companies, well drillers and some irrigation dealers. Remember, chlorine is a noxious and dangerous gas.

I recommend using common household bleach for a couple of reasons. Household bleach is the safest form to handle because of its low level of chlorine and it is easy to obtain, as almost all grocery and convenience stores have it in stock.

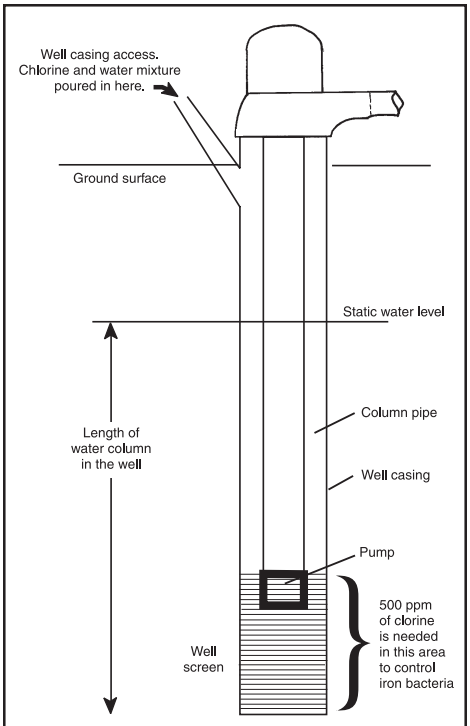

Figure 1. Annual chlorination of a well is needed to control iron bacteria.

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

You must chlorinate the well before you pump out your pipelines for the winter. Use the following procedure:

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, the static water level is at 20 feet and the column of water is 80 feet deep, you need 8 x 0.6 gallon/10 feet, or 4.8 gallons (use 5 gallons) of chlorine bleach The amount of HTH you need would be 8 x 0.35 pounds/10 feet, or 2.8 pounds (use 3 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 liquid bleach, mix with 50 or more gallons of water and pour into the well. Add at least 100 gallons of water to distribute throughout the well.
   b. When using chlorine granules or powder, dissolve slowly by adding to 50 gallons of water or more. Pour slowly into the well, then add at least 100 gallons of water to distribute throughout the well.
   c. When using chlorine pellets, drop them through the well access hole very slowly (about 20 to 30 pellets every minute). Afterward, pour 10 gallons of water down the access hole to wash off any pellets stuck in the access pipe or hung up on pipe flanges.
4. Wait at least four hours.
5. Surge the well for one hour (surging is starting and stopping the pump, but not letting the water 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. With some deep-well turbine pumps, water flowing back into the well can cause the impellers to rotate backward, and starting the pump during this time may loosen the impellers from their seats.
6. Let the chlorine stand in the well for 24 hours. Chlorine needs time to kill iron bacteria.
7. Surge the well at least four more times, then pump the water to waste. You must pump the dirty water out of the well and not let the chlorine stay in the well over winter. The water should smell and be dark brown, black or red. Stand upwind because the chlorine smell could be strong. Pump until the odor of chlorine is gone and the water is clear.

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

By chlorinating your well on a consistent basis, well production should stay close to what it was when the well was drilled. NDSU Extension publication AE-97, "Care and Maintenance of Irrigation Wells," contains more information about the different types of chlorine, the chlorination procedure, causes of well problems, how to determine well performance and rehabilitation procedures. You can obtain a copy from your local county Extension office or by contacting the NDSU Agriculture Communication Distribution Center at (701) 231-7882. You also can find a copy online at *www.ag.ndsu.edu/pubs/irrigate.html*.

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This Winter, Point Your Center Pivot in the Right Direction

Compared with wind and sleet, the center pivot is a rather fragile machine. Center pivots that have no nearby protection, such as windbreaks, should be parked for the winter pointing to the northwest or southeast, not to the northeast or southwest, Figure 1. Ice storms and blizzards have damaged many center pivots that were parked pointing in the wrong direction.

From October to April, the worst storms and highest winds come from the northwest, so properly parking a pivot will present the smallest surface area to the wind. Exceptions to the parking direction are center pivots that border windbreaks. In this case, the pivot should be parked next to the windbreak.

While you are parking your pivot for the winter, check the following on the irrigation system. These tips could save you some work in the spring.

1. Inspect the sprinklers. Either note the location of damages or repair any damaged sprinklers or those not working properly.
2. Check all gearboxes for moisture accumulation. Make sure each contains the proper amount and type of grease. Drain off any moisture. If excessive moisture is evident, drain and replace the grease. Water mixed with the grease will decrease its lubrication ability and not provide the needed protection.

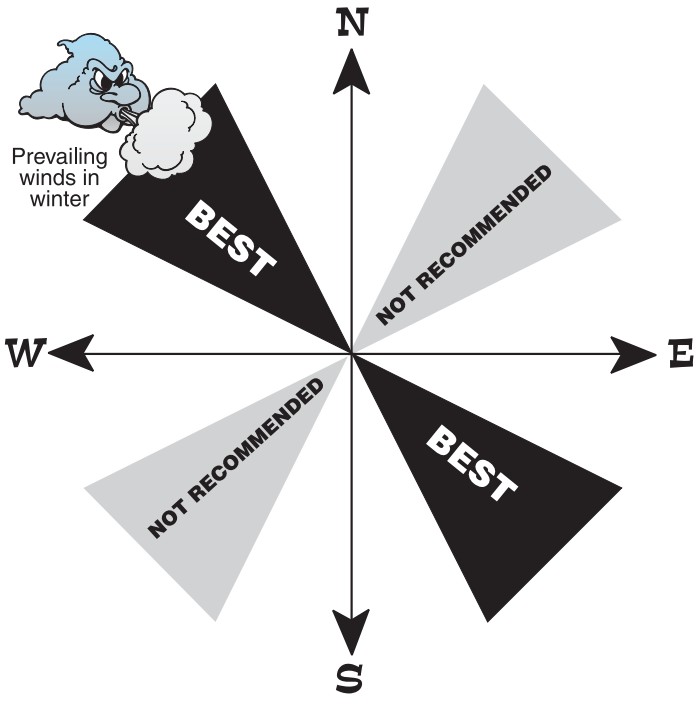

Figure 1. For the winter, point your pivot towards the northwest or southwest, not the northeast or southwest.

3. Lubricate all fittings.
4. Check the water drain valve at each span of a center pivot system.
5. Remove and clean the system end cap. Here is where sand scale and other debris collect during the summer. Remove the sand trap, flush the system and replace the trap. Drain all water-carrying lines. Drain the booster pump case.
6. Inflate tires to recommended pressure.
7. If livestock will be grazing in the irrigated field, put a fence around the pump and electrical panels. You also should consider protecting the pivot. Livestock chewing on wires and other parts sometimes can cause a lot of problems.
8. Plug all holes in the electrical panels to keep out rodents. Steel wool works the best.

Does Your Flow Meter Work?

As I travel around the state and visit irrigation systems, flow meters appear to be equipment that many irrigators don't use, don't repair and constantly overlook when managing their irrigation systems. Visiting an irrigation pumping plant and finding the flow meter not working is common. Often it has been that way for many years. North Dakota winters are hard on flow meters, and the freeze/thaw cycles quickly cause the bearings and other moving parts to wear out.

Flow meters and pressure gages provide extremely valuable management information. Having an accurate measure of the flow rate is important for proper chemigation, selecting and modifying sprinkler nozzles, calculating the application rate of the pivot, checking the production of the well and tracking the performance of the pump. This is important information.

If your flow meter is working properly, consider removing it this fall and storing it in a warm place for the winter. Removing the flow meter and covering the hole in the pipe with a piece of tin takes only about 15 minutes. If your flow meter is not working, remove it and have it repaired and calibrated. Your irrigation dealer can provide information on how to do this. If you take care of your flow meter, it will last a long time and provide accurate information on the performance of your irrigation system.

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