In this issue:

- Bismarck Irrigation Workshop Dec. 8 (part of North Dakota Water Users Convention)
- Does Your Irrigation Well Need to be Chlorinated?
- The Pressure Gauge is Important Indicator of Irrigation System Performance
- Some Suggestions For Before and After Fall Harvest

Bismarck Irrigation Workshop Dec. 8

The workshop will be at the Bismarck Ramkota Hotel in conjunction with the North Dakota Water Users Association’s annual convention Dec. 7, 8 and 9.

The NDSU Extension Service, North Dakota Irrigation Association and North Dakota Water Users Association sponsor the workshop.

The convention will include an irrigation and water products exposition. More information about the workshop will be in the October issue of Water Spouts.

Does Your Irrigation Well Need to be Chlorinated?

Since 2012, most of North Dakota has had average to above-average precipitation. Groundwater levels in most aquifers are generally in good shape and above their historical average. Under these conditions, most wells have had no trouble supplying the amount of water required for irrigation.

However, if we enter a dry period, water production problems may arise. Reduced pumping capacity becomes very apparent due to reduced recharge to the aquifer, lower groundwater levels and the irrigation system making more trips around the field. Under these conditions, a partially plugged screen will reduce the capacity of the well. Many irrigation wells begin to “suck air” and need to be “valved back.”

Has the production of your irrigation well fallen off the last few years? If so, it may be due to accumulated iron and other minerals on the screen, especially if the well hasn’t been chlorinated or cleaned for a few years.

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, it reduces the amount of open area of the screen and spaces in the material that surrounds the screen, which increases the depth of the pumping water level and can reduce the production of the well. During dry periods, reduced well yield will affect the operation of the irrigation system, increase energy costs and potentially reduce crop yields. The only way to control iron bacteria effectively is by chlorinating the well on an annual basis.

Well chlorination should be performed at least once per year, preferably in the fall. The object of well chlorination is to raise the level of active chlorine 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. Getting the chlorine out into the aquifer material surrounding the well screen also is especially important.
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 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 (6 percent chlorine) is the safest form to handle because of its low level of chlorine, and it is easy to obtain at almost all grocery and convenience stores. Some home supply stores stock 8 percent chlorine bleach. Make sure to use unscented bleach.

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.

**Chlorinate the well before you pump out your pipelines for the winter. Use the following procedure:**

1. Determine the depth of the 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 20 feet, the column of water is 80 feet. The amount of chlorine bleach you need is 8 x 2 quarts/10 feet, which equals 16 quarts or 4.8 gallons (use 5 gallons). The amount of HTH needed would be 8 x 5.6 ounces/10 feet, which equals 45 ounces or 2.8 pounds (use 3 pounds).

3. If you do not have a casing access pipe at least 2 inches in diameter, the chlorine mixture can be added to the well through the pump column pipe.

4. Create a chlorine mixture using one of the following methods. Use protective gloves and goggles. Chlorine solutions this strong can cause skin burns.

   - 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.

   - When using chlorine **granules or powder**, dissolve slowly by adding the granules or powder to 50 gallons of water or more. Pour the mixture into the well slowly, then add at least 100 gallons of water to distribute throughout the well.

   - When using chlorine **pellets**, you must have a well access hole at the surface. Do not use pellets if the chlorine mixture has to be put through the pump column pipe. Add the pellets very slowly (about 20 to 30 pellets every minute). Afterward, pour at least 20 gallons of water down the access hole to wash off any pellets stuck in the access pipe or hung up on pipe flanges.

5. Wait at least four hours.

<table>
<thead>
<tr>
<th>Well Diameter (inches)</th>
<th>Water in a 10-foot Column (gallons)</th>
<th>HTH Chlorine for 10-foot column (ounces)</th>
<th>Bleach 6% Chlorine for 10-foot column (quarts)</th>
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</thead>
<tbody>
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<td>4</td>
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<td>0.6</td>
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</tr>
<tr>
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<td>1.6</td>
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<tr>
<td>24</td>
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<td>22.5</td>
<td>8.0</td>
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</table>
6. 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; starting the pump during this time may loosen the impellers from their seats.

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. Make sure you pump the dirty water out of the well and not let the chlorine stay in the well during the winter because it is very corrosive to iron.

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.

By chlorinating your well on a consistent basis, the production of the well should stay close to what it was when the well was drilled. NDSU Extension publication AE97, “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 Agricultural Communications publication distribution center at 701 231-7882. You also can find a copy online at http://tinyurl.com/WellMaintenance.

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The Pressure Gauge is an Important Indicator of Irrigation System Performance

The pressure gauge is an often overlooked and neglected instrument on many irrigation systems. Yet it is probably the most important indicator of proper irrigation system operation readily available to you.

If the pressure at the pump decreases, you may have problems with the pump, or water levels have changed in the well, resulting in an increase in the pumping water level. The pressure gauge on a center pivot will indicate if the pivot has sufficient pressure to operate the sprinkler package for uniform distribution of water.

However, with time, pressure gauges lose their accuracy. Every time you turn the pump on, the pressure gauge receives a “shot” due to pressure fluctuations from filling the pipeline. In addition to the bounce at turn-on, pressure fluctuations and vibrations often occur while the pump is operating. Because of these conditions, pressure gauges (even liquid-filled types) lose their accuracy after a couple of growing seasons.

If your pressure gauges are old and you question their accuracy, now would be a good time to replace them. For center pivots, the one at the pivot point is probably the most important and should be the first one replaced.

Because a pressure gauge only conveys useful information when you are looking at it, why not install a shut-off valve between the gauge and the pipeline? When you want to check the pressure, just open the valve. This will extend the life of the pressure gauge and ensure you are getting accurate readings. Plus, this makes replacing the pressure gauge easy to do when the system is in operation.

Once a year, when the irrigation system is first started, write down the pressure reading somewhere handy. It may prove to be very useful information if you have problems during the growing season.

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Some Suggestions for Before and After Fall Harvest

Harvest time is always busy, and getting in a “rushed” state is easy to do. But that can lead to safety problems, plus cause you to miss some important crop production information as you move up and down the field.

Here are some simple harvest season reminders:

✔ Harvest safely – If tired, take a break. Make sure to have any self-propelled vehicles in park or the brake set before leaving the cab. Follow recommended maintenance and lubrication schedules.

✔ As you harvest, have a notebook handy to identify problem areas with low yields. Write down your observations, such as a lack of or too much water, too many weeds, variety differences, compaction or fertility.

✔ Keep track of yields by variety. This will help with selecting varieties next year.

✔ Take care of your crop after harvest. If drying is required, follow best procedures. Then have a storage plan for aeration and winter monitoring.

✔ Leave residue on the surface to prevent wind and water erosion.

✔ Soil testing will help guide next year’s fertility program.

✔ Save time for the family and friends during this busy season.

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