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water spouts

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Upcoming Irrigation Workshops

■ Dec. 12, 2013 (Thursday) – Bismarck Best Western Ramkota Inn

This workshop is held in conjunction with the North Dakota Water User Association's annual convention. The Missouri Slope Irrigation Development Association (MSIDA), NDSU Extension Service, North Dakota Irrigation Association and North Dakota Water Users Association are sponsors. The convention will include an irrigation exposition in which suppliers display their products and services. Workshop topics will include:

- Off-stream water storage for irrigation
- Subirrigation: Putting water into tile lines
- Site-specific soil/water compatibility information
- Irrigation for bioenergy production
 - Presentations on the energy beet project and ethanol production at Red Trail Energy and Blue Flint Ethanol
- Technical innovations for irrigation management
 - Presentations by NDSU and irrigation company representatives

■ Dec. 18, 2013 (Wednesday) – Ernie French Building, Williston Research Extension Center

Topics covered will include site-specific irrigable soils information, how to maximize soybean production, farm budgets for irrigated crop production, Nesson Valley irrigation research update and a session on technical innovations for irrigation management. Contact person is Chet Hill, (701) 774-4315, Chet.Hill@ndsu.edu.

Fall Maintenance for Irrigation Equipment

We all know that proper maintenance will extend the useful life of irrigation equipment. Fixing small problems in the fall is much less expensive than repairing a major breakdown next year. To winterize your irrigation system, consult the service manuals and the following checklist, or if you don't feel confident doing the maintenance or you don't have the time, contract with an irrigation dealer to do the service.

Water Delivery System

If your water source is a well, fall is the proper time to chlorinate it. Chlorine will control iron bacteria that, if left unchecked, will plug the screen and reduce the production capability of the well. The chlorination procedure is outlined in NDSU Extension publication AE97, "Care and Maintenance of Irrigation Wells." You can obtain a copy from your county Extension office or NDSU Agriculture Communication Distribution Center at (701) 231-7882. You also can find it online at www.ag.ndsu.edu/pubs/ageng/irrigate/ae97.pdf.

Pipes, valves, tanks, centrifugal pumps, etc., should be drained or pumped out to prevent damage from freezing. Underground pipelines need to be drained or pumped. Drains and pump-out risers should be capped following draining or pumping to keep water from seeping back into the line.

Pipeline pump-out locations should be checked a couple of days after pumping. If the pipe is full of water, it will need to be pumped again. Protect pump-out risers and other equipment from livestock. Close or cover any openings that might invite rodent entry.

Electrical Motors and Control Panels

- Check all motor openings to see they are screened properly to keep rodents out. If a screen is damaged or missing, replace it with ¼-inch metal mesh screen. This screen can be left in place during operation without it plugging with dust and debris. Electric motors do not need to be covered. Leaving them open to free air movement will keep moisture condensation in the motor to a minimum.
- Lubricate all bearings.
- Lock the control box in the "off" position.
- Spray electrical contacts with contact cleaner to displace dirt and moisture and prevent corrosion.
- Replace panel door seals if hard or broken to keep moisture and dust out.
- Check the level of oil in the reservoir and change the oil if it is discolored.

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Pumps

- Lubricate all bearings. If they are oil-lubricated, after the pump is cold, open the oiler and let oil drip into the line shaft bearings. Rotate the shaft to distribute the oil over the entire bearing. The cold oil will adhere to the bearings and provide good winter protection.
- Drain water from the pump and connecting pipelines; replace the plugs.
- Loosen the packing gland if used.
- Lubricate the shaft.
- Loosen any belts. Insert grease-proof paper between the belts and pulleys.
- If possible, remove the flow meter and pressure gauges, and cover the holes. If the flow meter or pressure gauges do not work, this would be a good time to have them repaired or replaced.

Aluminum Pipe

Pipes should be stored on racks so that one end is above the ground to permit drainage and air circulation. With metal prices at an all-time high, store the pipes at your farmstead if possible to deter thieves. If left in the field, store them so they are out of sight.

Protect the pipes from livestock. Remove and inspect gaskets, and if any are damaged or leaked during use, obtain replacements before next year's irrigation season. Store the gaskets in clean water in a place that will not freeze. This prevents them from cracking and drying out. Do not store gaskets on a nail or hook. If they cannot be stored in water, place them over a tube about the same size as the gasket and keep them out of direct sunlight. Covering the gaskets to restrict air movement also will help prevent them from drying out and cracking. Loosen connectors of pipe remaining in the field.

Sprinkler Systems

- Each sprinkler head should be inspected. Make sure the nozzle is not chipped or broken. Look for any broken parts on the sprinkler. Note the location of damaged sprinkler heads and replace or fix them before the next irrigation season.
- Check all gearboxes for moisture accumulation and make sure each contains the proper amount of grease. Drain off any moisture that's present. If excessive moisture is evident, drain and replace the grease because water mixed with the grease will decrease its lubrication ability and not provide the needed protection.
- Lubricate all fittings.
- Check the water drain valve at each span of a center pivot system.
- 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.
- Park the system into or with the prevailing wind, which is the northwest or southeast direction. If livestock will be in

the field with the system, it should be fenced to keep the livestock away from it. Cattle can damage sprinkler drop tubes and exposed wiring.

Chemical Injector Pumps

- Flush with water. If belt driven, loosen the belt. If transportable, store the pumps in a clean, dry place.
- Drain and refill the gearbox, and lubricate pump.

Internal Combustion Engines

Internal combustion engines need special attention to the lubrication, cooling system, ignition, engine openings and fuel system. Winterizing and housing would be ideal. Where providing housing is impossible, proper winterization is especially important.

- Change the oil and filter when the engine is warm, then run the engine briefly to circulate the oil. Clean and replace the air cleaner.
- Remove and clean the spark plugs, pour 2 ounces of oil into each plug hole and replace plugs. Rotate the crankshaft several turns to allow the oil to coat the cylinder walls thoroughly.
- The cooling system should be flushed and refilled with the proper antifreeze solution. This will prevent rust and scale from forming in the cooling system.
- Fuel: For gasoline engines, add fuel stabilizer and run the engine, or drain all the fuel from tank, lines and carburetor. For diesel engines, fill the tank; **do not** drain. Replace the fuel filter and leave all lines and injectors filled with diesel fuel. For LP gas engines, drain the vaporizer-regulator (fuel and water lines).
- Seal all openings (air cleaner inlet, exhaust, distributor cap and crankcase breather tube) with weatherproof tape.
- Lubricate all accessories. Loosen belts. Remove the battery, charge it and store it in a cool, dry place.

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Fantasy Irrigation

In fantasy football, wanna-be football coaches in TV-land are able to "draft" real football players to compile their dream-squad football team. They then use them to play a "fantasy game" on Sundays with other dream teams. Recently, in a similar mode, irrigation specialists from around the country got together on the Internet and developed a dream list of irrigation practices they felt would help U.S. irrigators.

Here are some of the dream irrigation practices that they came up with:

Management

- Measure flow and the total amount of irrigation applied by installing a flow meter.
 - If a permanent meter cannot be installed, borrow a portable flow meter; take a reading while at the same time linking

it to some hour totalizer (for example, on a power unit, panel control box, etc.). Seasonal hours of operation then can be used to obtain annual irrigation depth applied.

– Use newly collected data to give you an end-of-year report card by calculating your irrigation use efficiency (IUE). IUE is your irrigated yield minus your dryland yield divided by total inches of irrigation applied. Compare with published IUE values. For example, a typical IUE for corn is 11.9 bushels/acre/inch (bu/ac/inch) of irrigation. If your IUE, however, was just 10 bu/ac/inch, then you are 84 percent of the average – a solid “B,” but definitely not an “A,” so you might want to investigate ways to improve your irrigation efficiency.

- Schedule irrigation with a computer-based program that uses weather data or with an atmometer (something like a minievaporation pan on stilts).
- Better yet, use soil moisture sensors (ideally wireless) to schedule irrigation.
- Mistakes on irrigation often occur at the beginning and at the end of the season.
 - Quite often with early season rains, it is easy to ignore the irrigation system to focus on spraying and planting of late-season crops, and then a dry spell comes along and the irrigation system isn’t ready to go.
 - Don’t cut off irrigation too early. Water until the corn milk line is at the one-half to three-fourths stage and soybeans are well into the R-6 stage, with some foliage showing yellowing and the beans in the pod touching each other.
 - For corn and beans, obtain information on the test weigh because late-season irrigation practices affect yield primarily by increasing seed mass and sometimes are a reflection of how right on the last irrigation was. Corn tests should be greater than 56 pounds/bushel and normal soybeans should have a seed that, when laid on a penny, will cover Mr. Lincoln’s face.
- Go to the air: Aerial images of your irrigated fields could show irrigation-related problems (especially on pivots, where they are easy to visualize because they show up as concentric rings). Use your yield monitor data (especially on furrow-irrigated fields) to see if you can catch some irrigated-related problem, say weaker yields at the bottom (rows getting out too slow) or in the top half of the fields (possibly running water too long).

Tips for Sprinkler Systems

- For sprinkler systems, evaluate the sprinkler nozzle package. Sprinkler nozzles older than 7 years should be checked annually. Nozzles can be checked for uniformity using catch cans or rain gauges. Some types of nozzles may wear out faster, especially if sand is entrained in the irrigation water source.
- Check the precipitation rate received underneath the lateral, compared with that received underneath the end gun; they should be equal but are often not. The remedy is easy: Change the nozzle diameter of the end gun.

- While renozzling, seek to reduce pressure. Pressure breaks up droplets, causing increased wind drift. An added advantage is that lowering pressure reduces pumping costs.
- Choose nozzle types based on reducing drift. For example, a serrated splash plate that forms spider legs of water won’t have as much drift as will flat splash plates. Rotator-type sprinklers won’t drift as much as impacts (again, primarily because of large drop size).
- Use drops; the lower placement of the nozzle, the better, especially in windy areas. While the nozzles need to clear the top of a corn crop, a drop to this level is better than the sprinkler being on top of the span.

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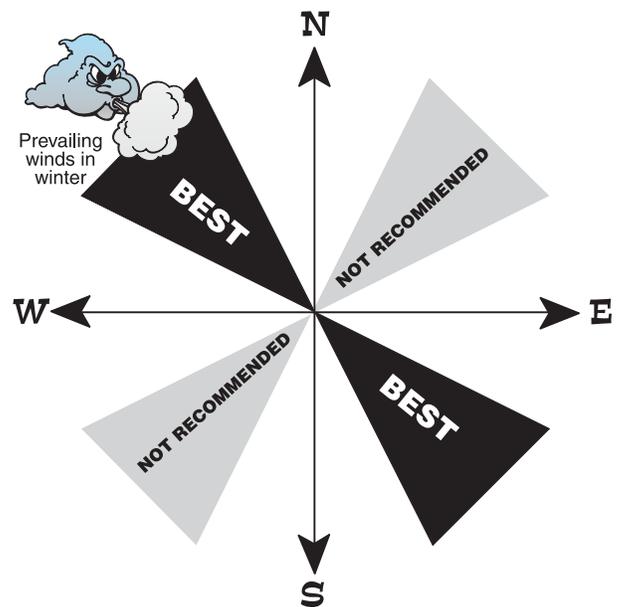
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Point Your Center Pivot in the Right Direction

In wind and sleet, the center pivot is a rather fragile machine. From October to April, the worst storms and highest winds generally come from the **northwest or southeast**. Ice storms and blizzards have damaged many center pivots that were parked pointing in the wrong direction (figure below). Properly parking a pivot will present the smallest surface area to the wind.

Exceptions are center pivots that border windbreaks. In this case, the pivot should be parked next to the windbreak. On hilly fields where the pivot point is at or near the top of the hill, the center pivot should be parked going down the steepest hill.



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