

Penn State Cooperative Extension Capitol Region Dairy Team

DO YOU HAVE ENOUGH WATER FOR THE SUMMER?

Thomas R. McCarty
Extension Agent
— Water Quality
Capitol Region

Holes in rock are selling like funnel cakes at the county fair. The folks who make them are extremely busy in southeastern Pennsylvania. The folks buying them usually already own one that is proving to be too shallow. I am talking about wells, of course.

The water table is reaching record low levels in many places. When it drops below the bottom of a homeowner's well, it causes them an inconvenience. When it drops below the bottom of your farm well, it's an emergency!

The point is, there are only few people depending on the water from a homeowner's well while there are probably 50 to several hundred cows drawing water from your farm well. Households can be supplied with water from the grocery store, but your farm cannot.

I hope this convinces you to do two things. The first is to make a

plan for a water emergency. The second is to monitor the water level in your well. This will allow you to predict a water shortage far enough ahead to be able to supply water without interruption.

Let's look at monitoring your well first. I mentioned that groundwater levels are reaching record lows. This year's window of opportunity for recharge is also closing. Recharge usually occurs between October and May. After crops begin growing actively, they effectively prevent rainfall from reaching the water table. They transpire water at rates sufficient to use all rainfall that infiltrates from May to September.

For this reason, I believe monitoring of wells supplying livestock water is an important first step. We will enter the summer at record low levels and the levels will likely fall still farther. We are entering uncharted territory.

The object of monitoring is to determine if there is adequate water over the pump intake in the well for uninterrupted water use. I suggest two measurements be made on the same day. The

first should be done at the end of a period of minimum use, perhaps the first thing in the morning. Suppose you measured 50 feet from ground level to water level. The second measurement should occur at the end of a period of maximum use. This would typically be after the morning or evening chores are finished. Suppose this measurement is 150 feet from ground level to water level. Repeat these measurements for several days to be sure they are representative. If there is little or no difference between these two measurements, the well is high yielding. Significant differences in these two readings is an indication that the flow rate of the well is beginning to diminish.

To evaluate the measurements we also need to know at what depth the pump intake is located. Let's suppose it is at the 200-foot level. A morning measurement of 50 feet would indicate there is 150 feet of water over the pump. This should make you cheer. A measurement of 150 feet following a heavy use period still leaves us with 50 feet of water covering the pump. This is still adequate, since 10 feet of water should be sufficient to let the pump operate satisfactorily. The difference between the two readings, which in this example was 100 feet, should be written down somewhere for monitoring and for future reference.

The next step is to continue the early morning measurements on a weekly or monthly basis. If this measurement drops to 90 feet and the differential reading stays at 100 feet, the well has now reached the critical point of 10 feet of water over the pump during heavy use. Monitoring the water levels periodically and graphing the readings over time can help you predict when you could potentially expect a serious water shortage problem.

Let me list some key points about measuring water depths. First, don't drop equipment down the well. Bore a hole in a piece of plywood and feed the measuring tape through that. Second, don't get the tape stuck. There are centering guides along the pipe to make the pipe and wire stand off from the borehole, which makes the job of lowering the tape interesting. Connect a slender weight securely to the tape, and make sure there are no edges or frays that will cause it to get snagged. Don't use a weight that would be a catastrophe if lost in the well, such as lead, for example. A steel tape coated with carpenter's chalk makes the water level easy to read. A solid cake kind of chalk works well for this. Finally, the tape and weight should be disinfected before sending it down the borehole. If you don't have a bacteria problem, don't create one.

The other important action to take is to develop an emergency plan. What would you do if there were no water tomorrow morning? We hope you will never experience this. How could you quickly get water to the operation in this emergency?

Some important things to consider are a source of water and a way to get it to the farm, a sanitary storage tank, a second pump to remove water from storage, piping to deliver water to the appropriate places, and a method of disinfecting the water. This plan should be reviewed with other people who will be affected, such as the milk sanitarian, the contractor for feeder animals, employees, etc.

Longer term planning could include having a back up pump and all the equipment necessary for pulling the pump. Materials to sanitize the well after pump replacement should also be available. A possible long-term goal

could be to have a backup well, especially on a larger operation.

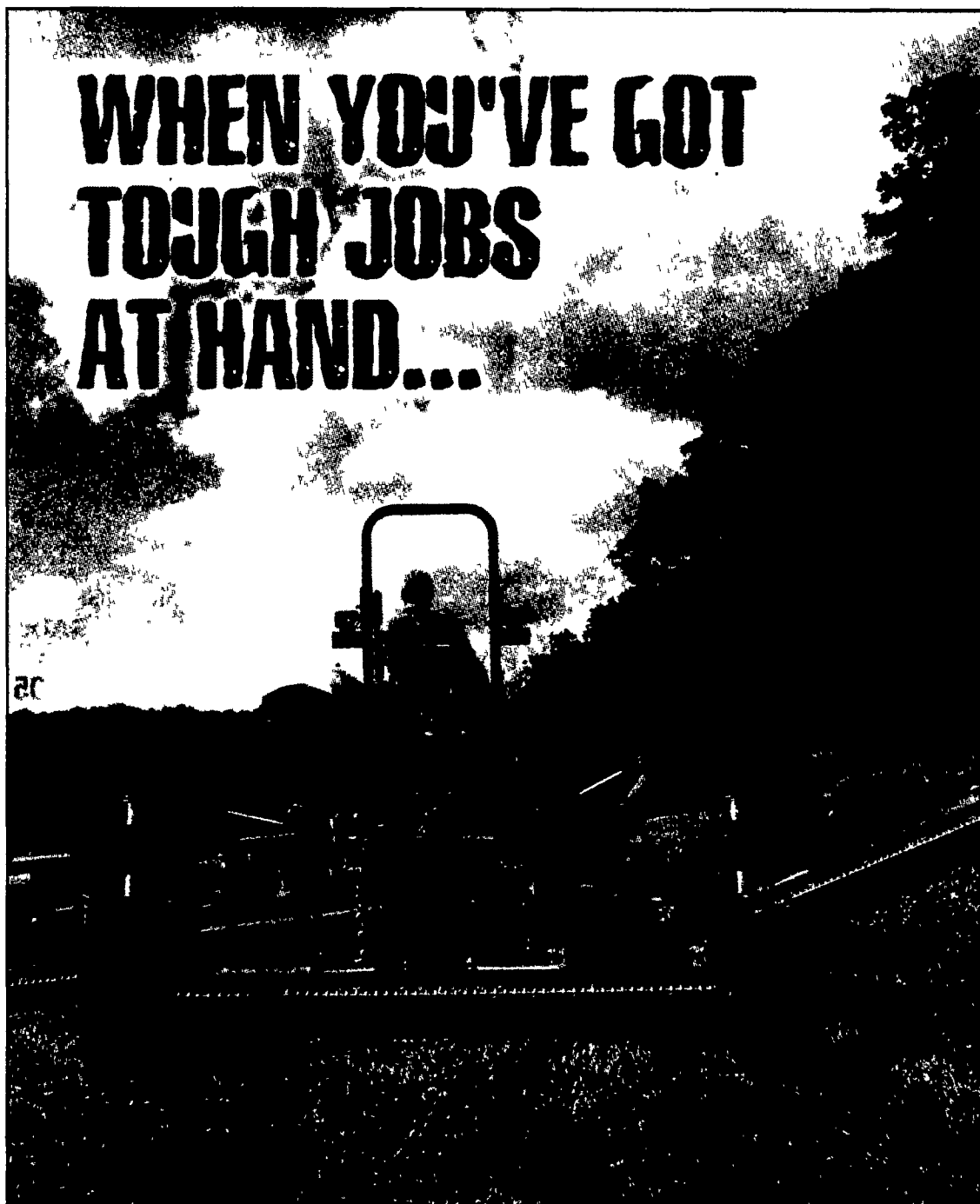
Before drilling a well, consult with a hydrogeologist to help select a site that is likely to provide a high yield of water. Is the site far enough removed from other wells and possible sources of contamination? Is it in a convenient location for future expansion? After satisfying these considerations, the well can be drilled and developed. Developing a well refers to the procedure used to clean mud from the walls of the borehole and fines from the water bearing zones near the well so that the well can achieve a high yield.

Be sure the well is properly cased and protected from surface water contamination. Final considerations would be providing adequate pipe and wire size for satisfactory pump operation. Also, develop an effective maintenance schedule for the well, especially if it remains an occasional-use well.

Consult the following references for additional information:

- [http://www.erh.noaa.gov/er/marf/ Mid-Atlantic River Forecast Center](http://www.erh.noaa.gov/er/marf/Mid-AtlanticRiverForecastCenter), a source for weather data.
- <http://waterdata.usgs.gov/pa/nwis/current?type= gw> USGS site providing water levels in their monitoring wells.
- <http://www.dcnr.state.pa.us/topogeo/> Department of Conservation and Natural Resources, which provides information about groundwater and wells.
- <http://www.cas.psu.edu> Penn State College of Agricultural Sciences site. Look under Current Issues — Drought, for more information.
- "Managing Your Well During a Drought," a fact sheet available from Penn State Cooperative Extension.


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