

Proper Well Construction First Step In Water Quality

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groundwater contamination later on — especially from surface water, according to Ressler. The key is overall management, which begins first with proper construction.

Hear about nitrates

"It seems like whenever you see a story on wells in a newspaper or something, you hear about the contamination and the high nitrates and all the other problems," said Ralph Myers, of Myers Brothers Drilling Contractors, Inc. in Salunga. "Actually, there are still quite a number of hand-dug wells and springs that use water that is very close to the surface. It seems to me that it's the same old story — bad news is more popular than good news."

Myers said there are "tens of thousands" of "perfectly good water wells out there, and even if there are some slight problems with that water, I like to believe that in almost any water well, the quality of the water is going to be better than, say, Susquehanna River water."

Nearly 10 percent of Myers business involves drilling wells for farmers. Even though most of the work involves drilling for commercial wells and private residences, Myers has drilled wells for farmers who have had nitrate problems. But most of the business involves drilling wells for farmers who need an additional, or backup, source of well water. And of those new wells drilled, a commonplace, important test that Myers uses is for nitrates.

"If a farm may have a nitrate problem, we'll test for nitrates and try to dig deeper for better water," Myers said. "Some areas are so honeycombed . . . the bedrock is so honeycombed that even though you can install a lot of casing in the well, you still might have high nitrate levels. But I can point to quite a few now that we've been able to improve the existing nitrate level."

Most of the work, he said, is for additional water. "They're putting in a new hog operation, or they're increasing their dairy herd. It's not enough just to have only one water well on the farm. In a lot of places, they want a backup water well."

Myers warns that nothing about well drilling "is black and white. You can't say this is the way it is. But in general, the little aquifers, the little crevices and cracks that allow water into the well, are smaller the deeper you get down into the bedrock. So until you have enough water for your operation, the wells will average somewhat deeper than they did when people were using the water closer to the surface."

Deepest drilled

Typical wells are drilled to about 150-200 feet, although Myers has drilled to 300 feet, and in some cases 500-600 feet. The deepest they have drilled is to about 1,000 feet.

Myers employs the following procedures when drilling:

- A site is selected. Normally, when possible, the site is isolated from barnyard and herd areas, and is located on hilly, nonfarmed ground. The farmer must take other factors into consideration, such as keeping the site at least 100 feet from a manure storage or pesticide mixing and storage area.

- The drilling rig is placed and leveled at the site. A 9- or 10-inch bit is mounted to the drill and worked into the ground until competent bedrock is found.

- Next, a casing, of polyvinyl chloride (PVC) or steel is centered into the hole to the bedrock. The casing is "plum and centered."

- A 6-inch bit is mounted to the drill and drilling continues. The drill sinks to a level until water is reached. If adequate water is not obtained by 300 feet, Myers asks the customer to talk over his options. Depending on conditions, Myers said they either encourage the customer to dig deeper or move to a new location.

- When a measurable flow is found, air is pumped into the well to lift the water to the surface, where it is collected and run through a pipe. The water flow is checked with a stop watch and a gallon bucket. A water sample can then be taken on site to test for nitrates.

- If the flow is adequate at this point, the well is developed for a period of time to clear all cuttings from the well. If cement grouting is not required, at this time Myers fills the space between the ground and the casing. The drill is then removed and the well is ready for the pump installation.

Throughout the process, the water flow is monitored until both Myers and the customer are satisfied.

"The most important point in the water well is where the casing meets the bedrock," said Myers. "It's important that this area is sealed — that no water can transfer from the surface into the underground area that you want to use for your water supply."

The use of plastic PVC or steel casing depends on the bedrock — steel will "give" a little with the contour of the rock. But in softer formations, PVC may be better because the rock will conform to the shape of the PVC.

Neoprene baffles or packers are available as an extra precaution to more fully seal the casing.

"The most dependable wells are the wells that come in deeper, too," said Myers. "The first wells to suffer in a drought are the springs and the hand-dug wells and the real shallow-drilled wells — they're the people we get calls from."

The drought of 1991 pointed to the need for deeper wells. Many dried up for lack of water, and Myers had a busy year. "We had calls this year from people that had water problems. This is also a good year . . . we have been busy every minute."

Myers and others in the industry emphasize the importance of periodic well water testing to see if the water quality is changing.

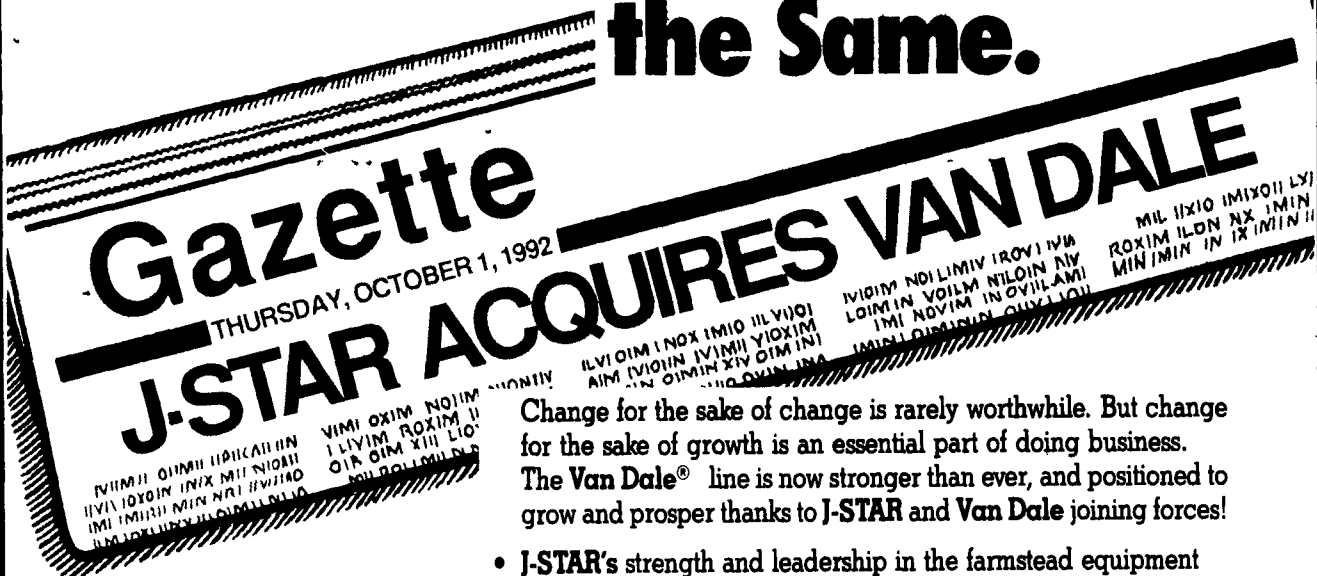
"If water quality is deteriorating, it may be more practical to drill a new well," he said.

"It's probably a good idea for someone to have their water sampled and analyzed for basic potability, and it doesn't cost a lot of money," said Myers. "It's probably a good idea to do that at least annually, or semiannually — just get in the habit of doing that. That way you know if your water quality is changing as time goes on."



Time has passed since an anhydrous ammonia spill leached nutrients into this well, according to Clark Stauffer. The levels of nitrates have returned to near normal.

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J-STAR Industries, Inc.
801 Janesville Avenue
Fort Atkinson, WI 53538 U.S.A.
414-563-5521 (Phone) 414-563-2494 (FAX)