



## Smart Submersibles:

# THE PRESSURE IS ON

– Part 2

by John Vastyan

**A**t a new home in Lancaster, Pa., the homeowners had a list of home system prerequisites “a mile long,” according to Chris Myers of Landisville, Pa.-based Myers Brothers Drilling. “They’d been researching all aspects of their new home for years,” he explains. “And there on the list was a section labeled ‘Domestic water system.’ Under that were a few items having to do with the well, including the name of our firm – that felt good. Also on the list, they wrote, ‘steady water pressure for six bathrooms, Jacuzzi and garden watering.’”

“Fortunately, the home’s well, which we dug to 350 feet, hit a pretty good supply of water,” continues Myers. “The 5,000-square-foot home would have three active bathrooms immediately, and three more were planned for the basement that they planned to finish in a few years. The SQE system from Grundfos was a perfect match for their need, and they didn’t flinch at the cost difference between a standard pump and the constant pressure system. It meets their needs exactly.”

“Kathleen and I had been in the house for just three weeks,” says Douglas DeAngelis of the new home he and his wife moved into a few months after Chris Myers and his crews finished the well system installation. “We’re very impressed with the system.

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I really appreciate the level of control we have, but what we enjoy most of all is the steady flow of water, and the incredible pressure it delivers. We know we made the right decision to have it installed.

“Both of us have lived in homes fed by municipal water and well water systems,” continues DeAngelis. “Our ‘mile-long’ list that Chris saw came both from research and experience. The well water system needs that we stated came mostly from experience – like the nuisance of low water pressure in the home if someone’s watering plants outside. Or, worst of all, a sudden burst of scalding water in the shower when someone flushes a toilet. That was a no-brainer. We made sure Chris understood that we didn’t want to deal with that.”

As a retired aircraft mechanic, DeAngelis is no stranger to technology. He asked many questions about the well water system that Myers Brothers recommended. “I was amazed at how quickly he was up to speed on it,” notes Myers. “He understood everything almost immediately, and when we were done talking about it, he was completely satisfied with our explanations, and the system we recommended.”

DeAngelis was there the day Myers Brothers drilled the well, and then later when they installed the pump system. “We have a structured wiring system within the home,” explains the homeowner. “That becomes the backbone for a complete home automation system. It will connect the fire, security, home computing, HVAC, music and video systems. And, now, once we’ve got it all set up, we can add the well water system to it. We’ll be able to monitor and control all of the home’s connected systems from the main PC at home, or even from a laptop in my hotel room if I’m away.”

Though home automation hasn’t yet become mainstream, constant pressure well water systems are quickly moving in that direction. There’s some truly brilliant engineering in this technology, much of it tailored to the needs of professional installers. Additional

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Preparing the pump for installation.



Tom Shenk lowers the pump into the well with assistance from Robert Hummel.

protection and applications features are designed-in by some manufacturers, offering installers the flexibility to adapt the pump to many different applications. The small horsepower Grundfos line of variable frequency drives (VFD), for instance, includes two pump system models: the standard SQ for traditional pressure switch operation and the more advanced, constant pressure SOE. Both models offer five flow sizes from 5 gpm to 30 gpm and a horsepower range of  $\frac{1}{8}$  to  $1\frac{1}{2}$ .

Both pump systems incorporate the following common features: dry-run protection, protection against up-thrust, soft-start, over-voltage and under-voltage protection, overload protection, over-temperature protection, and high starting torque, comparable with three-wire motors. Additional benefits of SOE pumps include constant pressure control, variable-speed regulation, and electronic control and communication.

The "smart" motor communicates through the power leads into the CU300 microprocessor-based status box – it's not necessary to run any additional wires down the well. Through its communication with the pump, you achieve constant pressure control and the ability to change and monitor pump performance.

Another of the key attributes of this new technology is an electronically controlled permanent-magnet motor. This state-of-the-art technology allows the pump to start-up without drawing high amps, unlike a conventional induction motor. And the pumps use single-phase power and a simple two-wire design, while providing starting torques comparable to three-phase motors.

Yet, the "higher life form" comes with a

few caveats:

One of them is the need to be sure that an aboveground, non-integrated VFD, sold by some manufacturers, isn't located too near existing (or later) electronics. The unit's drive components do create electrical noise. Some sensitive electronic equipment – such as high-speed modems, or Internet system servers – shouldn't be within 6 feet of them. The harmonics issue – electrical noise – virtually disappears when the VFD is put down in the well with the motor. Radio frequency interference is, for all practical purposes, eliminated.

Remote, non-integrated VFDs can be at risk in harsh environments such as the factory floor, or in an unfinished basement. To protect them, there may be the need for costly air conditioning or air filtration systems. Because this system's VFD is integrated into the submersible motor, the VFD is beyond the reach of dust and heat, both known VFD predators. In the well, the integrated VFD is cool, wet and dust-free.

Because these more sophisticated systems rely on computer electronics, they keep an electrical charge – possibly up to several hundred volts stored in capacitors. So, when servicing them, it pays to be cautious. It states clearly in the instructions: Wait at least 15 minutes after powering-down before opening the unit to do repairs or diagnostic work. The SOE is sealed, so this won't affect it.

Because the system is more expensive (about a 40% increase over a conventional installation), installers are encouraged to add



Chris Myers calibrates the control operations.

lightning/surge protection. Sounds like a good investment to me. Pumps with 1 HP motors, or less, often have this protection built-in. But this should be verified with the supplier. Even with that protection, installing redundant light-

ning/surge suppression on any pump is not a bad thing. And, in some instances, a lightning arrester may be required to protect the pump. The arrester should be wired to the line conductor and back to the electrical

grounding system with No. 6 AWG copper wire, or a heavier wire or cable (but nothing lighter than that). In some power supply circumstances, the electrical grounding is connected to steel well casing. It wouldn't be a bad idea

to check with an electrical inspector on that one.

At the home where Chris Myers installed the replacement pump system, an electrician was on hand to complete the job. He installed a small (3"x4") SyCom 120/240 single phase, 150,000 amp surge current suppressor on the line side of the well pump control, protecting the pump and control unit from common, everyday voltage variations.

This also was a good idea because the homeowner had installed an LP gas-fired, 15 KW whole-house, back-up generator. Though its output was said to be smooth, it increased the chance of electrical spikes. With the SyCom unit in place, the well water system was safeguarded, and only a direct lightning strike at the well would overwhelm it. And we all know there's not much we can do about that one.

But what you can do is offer the very best expertise, advice and equipment to your customers. **ND**

*John Vastyan is a Manheim, Pa.-based journalist and communications professional whose work focuses on geothermal, plumbing and mechanical and radiant heat industries. He can be reached at [cground@ptd.net](mailto:cground@ptd.net).*