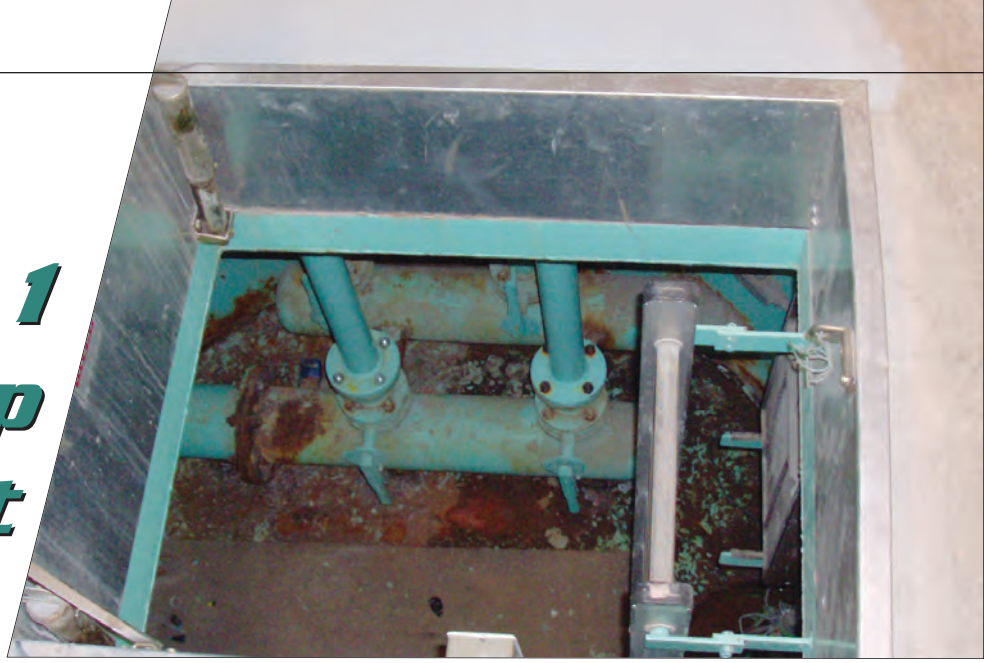
By Jon Steele, Technical Assistant

Rice RWD 1 Moves Pump Out of Pit



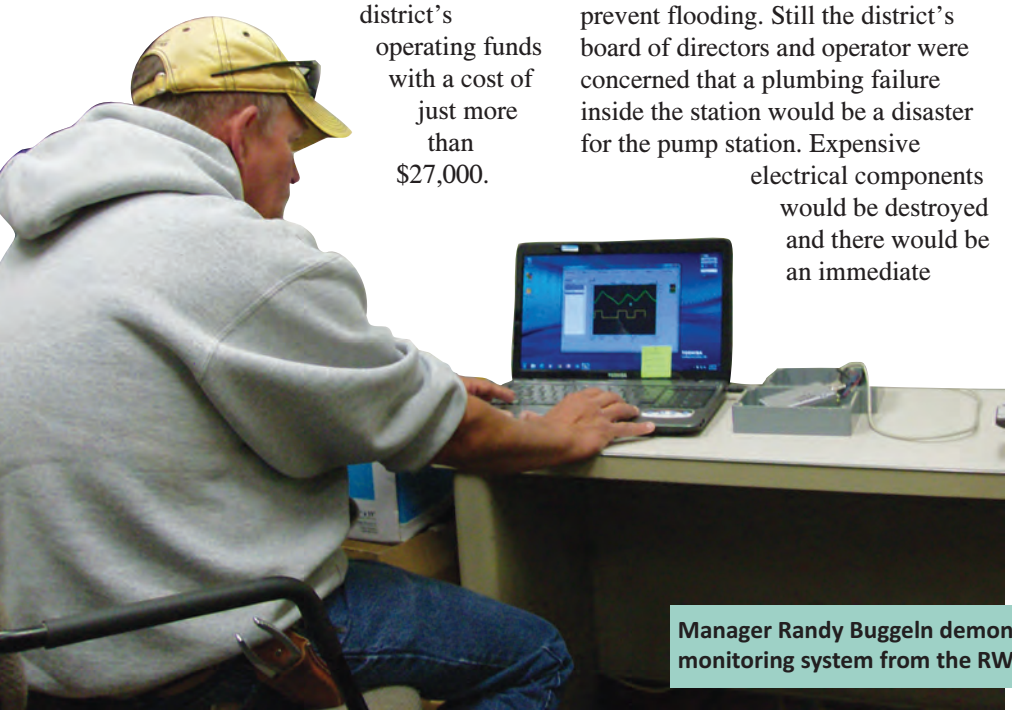
This photo shows the view of the plumbing in the old pump pit.

Rice County Rural Water District 1 has moved its booster pump station out of an eight-foot deep pit to a new above-ground structure. It's a move that has been in the making for years. While some in other water utilities might consider this to be a small project, I think the work is a stellar example of sound system management and goes a long way towards demonstrating sustainability by a small rural water district. The district's manager/operator planned the project and performed much of the work himself; the project was financed from the district's operating funds with a cost of just more than $27,000.

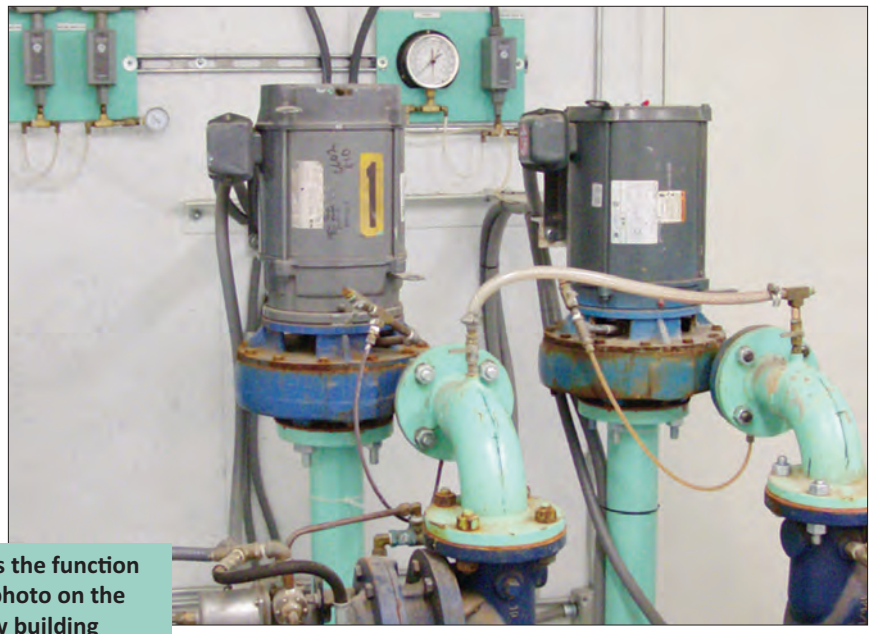
The district's original booster pump station was a prefabricated steel tank. Problems with the Rice RWD 1 underground station included corrosion, and it was considered a confined space. In the case of Rice RWD 1, the corrosion and confined space were real concerns but were secondary to the potential for flooding due to heavy runoff since the pump station was located in an area prone to flood. The district had attempted to dike around the pump station to prevent flooding. Still the district's board of directors and operator were concerned that a plumbing failure inside the station would be a disaster for the pump station. Expensive electrical components would be destroyed and there would be an immediate electrical hazard. In such a situation the district's 425 customers would be out of water until repairs could be made.

I had suggested to the district's manager Randy Buggeln several years ago that the district should consider moving the controls from the in-ground station. Subsequent discussions about this and Randy's persistence gained a commitment by the board to agree to replacing the station with an above-ground structure.

District manager/operator Buggeln worked with the Kansas Department of Health and Environment to obtain approval of plans. Randy did most of the work himself including building brackets, moving equipment and installing the plumbing. Construction of the small building and the electrical controls were contracted out. The new building is constructed of 8-inch thick concrete; it is situated directly over the original pump station. The only materials remaining in the original pit station are the incoming and outgoing piping and the pressure transducer. All electrical components and the pumps



Manager Randy Buggeln demonstrates the monitoring system from the RWD 1 office.



Rice RWD 1 manager Randy Buggeln explains the function of the backup pressure control system. The photo on the right show the booster pumps inside the new building

are situated in the new building. Randy pointed out a key feature about the concrete construction. Concrete is a material of choice for remote structures because it is bullet proof. A gunshot from a high-powered rifle could easily penetrate common wood or thin metal structures resulting in damaged electrical components. Gunshot damage is common in rural areas; Rice RWD 1's elevated story tank nearby has several bullet dings on it.

Fewer problems

The new pump building has many advantages over the original in-ground station. As mentioned, the risk of flooding has been eliminated. The manager/operator can check on the station without the concerns of entering a confined space. Corrosion and moisture problems have been eliminated. Critical components will have a longer useful life. Because the new building has so much more space than the old vault, it allows for much easier access.

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valves and wasting expensive, purchased water. When Randy asked me about VFD drives, we went to see one in action in a neighboring water system. Randy was sold on it as he watched the unit gradually ramp to full speed and then ran through a gradual ramp down on shut down; there was no slam or water hammer and no pump control valves that failed to open or

This photo shows the outside view of the new pump house.

close. The old pump control valves are also being converted into simple check valves eliminating another headache of maintaining the valves. Manager Buggeln told me that the district has had numerous problems with the storage tank overflowing. This problem was generally due to having a sticky control valve on the pump. The new VFD drives accomplish the same purpose as the pump control valves by eliminating water hammer electrically instead of hydraulically. The 10 HP pump motors ramp gently through the start and stop cycle. In addition, the VFDs will provide more motor protection than conventional motor starters including any incoming power problems such as loss of phase and phase imbalances.

I still think it was rather unique that the old pump station had the capability of operating from telemetry or it could be operated from a pressure type switch system. This is good as a backup when the telemetry system is out of service. This pressure backup system was moved into the new building and will be kept in service for emergency situations.

Forward thinking

As I stated previously in this article, I think the project is a good example of proper system management "forward thinking" on the part of the manager and board of directors. And the district had the funds to pay for the change. Rice RWD 1 purchases water from the city of Lyons at $2.20 per 1,000 gallons. In 2011 the district purchased 51,711,000 gallons. The RWD uses a decreasing block rate to charge their customers including a minimum charge of $26.50 with no water included, and $4.25 per 1,000 gallons up to 20,000 gallons; then $3.50 per 1,000 gallons from 20,000 to 50,000 gallons, and $2.50 per 1,000 gallons for all water used in excess of 50,000 gallons.

KRWA staff are aware of the various funding programs that can help systems get the improvements they need.

Need help?

I would like to encourage any city or water district that has a situation that is troublesome to let someone at KRWA know about it. KRWA staff are knowledgeable and are available to provide a good discussion of what the options might be to improve any situation. And, KRWA staff are aware of the various funding programs that can help systems get the improvements they need. Call the KRWA office at 785-336-3760 or email to KRWA at krwa@krwa.net. Someone will be pleased to meet with system representatives or attend council and board meetings.

Jon Steele has been employed by KRWA as a Circuit Rider since 1995. Jon is certified as a water and wastewater operator. He has more than twenty-five years experience in public works, construction and industrial arts.