

Well grout study gains widespread attention

By Marla Augustine

For eight years, the Water Well Standards Program has conducted a literally ground breaking project that will help ensure that water is safe to drink. The study has generated national and even international interest.

A total of 168 water wells with transparent casings were drilled in order to observe the characteristics of the well excavation above the water table. The purpose of drilling wells with transparent casings was to observe what happens over time to the grout column that lines the well.



Photo: David Sizer

A drill crew installs a well made of clear plastic casing for the grout research project at the Pilger Recreation Area near Pilger, Nebraska.

Grout is the sealing that is found between the well and the excavated ground. Grouts stabilize the well and provide a seal that keeps contaminants out of the water. If the grout deteriorates, contaminants can potentially reach the groundwater.

Over 800 hours of video were shot to document the progression of the sealing properties of all types of well grouts over 16 months.

The program found that the physical makeup of the surrounding soils adversely affected grouts. Most grout types leaked when placed in an absorbent environment.

The study looked at bentonite slurry grouts which are comprised of 80% water- 20% bentonite clay; non-slurry bentonite, which is a dry, raw bentonite clay; and various cement grout slurries that incorporated sand, water and other additives.

What they found was that when placed in a dry, absorbent soil, cement grout maintains structure to stabilize the well, but develops cracks and fissures over time. Bentonite slurries (water and bentonite) lose the ability to provide a seal. However, dry bentonite holds its form, providing stability to the well and creating a seal. Consequently, a well grouted with dry bentonite in the part of the borehole above the water table has the best chance of protecting the groundwater we drink.

Using bentonite with wet sand above and a cement cover is the best way to protect a well, said **Jack Daniel**, Administrator of the Office of Drinking Water and Environmental Health.

“This is a significant finding that will impact what grout well drillers will use in the future,” he said.

The study was presented at the Nebraska Well Drillers national grout conference in October. Present at the conference were regulators from other states, engineers, planners and water well contractors, among others.

Water Well Standards program manager **Tom Christopherson**, who was involved in the study, has been asked to present the findings to national conferences in the future.

The study was a joint project of DHHS, the Nebraska Well Drillers Association, the Nebraska Conservation and Survey Division, Baroid, Cetco, Wyo-ben Drilling Products, and Design Water Technologies.