KENTUCKY WELL DRILLERS QUARTERLY

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COMPARING CONSTRUCTION AND ABANDONMENT STANDARDS FOR WATER AND MONITORING WELLS

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Two key Kentucky administrative regulations govern how wells are installed, modified, and properly abandoned: 401 KAR 6:310, which applies to water supply wells, and 401 KAR 6:350, which applies to monitoring wells. While the two regulations share a great deal of overlap, especially concerning prevention of cross aquifer contamination, there are key differences. Understanding these comparisons may highlight the benefits of obtaining dual certification, especially for monitoring well drillers.

Although the two regulations share many provisions, their differences reflect the purpose of each well type. Water supply wells are built for long-term use and reliable yield, while monitoring wells are designed for precision and protection in environmental settings. As a result, 401 KAR 6:350 is generally more prescriptive.

Shared Objectives

Both regulations emphasize three central principles:

1. Preventing contamination by sealing annular spaces and isolating water-bearing zones.

2. Using appropriate construction materials such as sound casing, grout, and screens.

3. Reporting and recordkeeping, including submission of the Uniform Kentucky Well Construction or Plugging Record within 60 days of completion.

Each also requires certified personnel to perform or directly supervise drilling, and both allow for variances when site conditions make strict compliance impractical.

Construction Requirements: Similar Goals, Different Details

401 KAR 6:310 (Water Supply Wells) sets standards for wells intended to provide water for homes, businesses, farms, and public systems. It focuses on ensuring a clean and reliable water source by requiring watertight casing, adequate surface protection, and sanitary seals.

401 KAR 6:350 (Monitoring Wells), in contrast, governs wells installed to collect environmental data or monitor groundwater quality. Because these wells are used for sampling, the regulation places greater emphasis on isolation and accuracy.

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Abandonment: Protecting the Resource After Use

Properly abandoning a well is as important as constructing it. Both 6:310 and 6:350 require that wells no longer in use be sealed to prevent movement of water or contaminants between aquifers.

- 401 KAR 6:310 generally requires unusable water supply wells to be abandoned within 30 days of determination. The casing should be removed, if possible, or cut off at least five feet below ground and sealed with approved materials.
- 401 KAR 6:350 requires a more stringent process for monitoring wells, particularly temporary installations, due to the assumed presence of contaminants.

In all cases, pumps and piping must be removed (when possible), approved sealing materials must be used, and a plugging record must be submitted to the Division of Water.

The Advantages of Dual Certification for Kentucky Drillers

For drillers working in Kentucky, holding certification in both **water well** and **monitoring well** construction offers clear professional and practical benefits. Dual certification is especially valuable for monitoring well drillers who frequently encounter off-site domestic wells during environmental site evaluations or remediation projects and water well drillers who might be requested to install monitoring wells in their area. Dual certification provides greater **flexibility, efficiency, and compliance** across a wide range of field situations. The process to obtain it is straightforward: a driller only needs to pass the corresponding state exam. The cost is limited to the **$80 exam fee** and the time needed to study and complete the test. To take the exam, contact the **Driller Certification Program Coordinator.**

For full regulatory text, see 401 KAR 6:310 and 401 KAR 6:350 at https://apps.legislature.ky.gov/law/kar.

Photos taken by Megan Sidaway

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DYE TRACE 101

Authored By: Kurtis Spears

Kentucky is known for many things bluegrass, bourbon, basketball, horse racing, and karst. With nearly half of the state being underlain by limestone, the potential for karst development is high across the commonwealth. For the millions of Kentuckians that live in karst areas, the benefits and hazards associated with them are present in their daily lives. Whether it's sinkholes, caves, or springs, many Karst features need to be studied. One method that is used by the Division of Water (and other agencies across the state) to better understand karst systems is dye tracing.

What is Dye Tracing?

Dye tracing is process that involves injecting non-toxic dye into a karst feature (i.e. sinkholes, karst windows, cave streams, etc.) and monitoring the area for potential destinations. Sites are monitored by placing charcoal-filled packets in nearby surface features (springs, streams, etc.). After the dye is injected into the system (either through natural or induced) the charcoal packs are collected. Charcoal packs are typically collected a week after injection but may be adjusted depending on flow conditions. After collection occurs, these packets are brought back to the lab and analyzed using a spectroflurophotometer. If the injected dye passed through one of the monitoring sites, the charcoal pack will have some of that dye absorbed. Fluorescent dyes are identified in the lab by matching the results to known wavelengths. Each fluorescent dye has a unique and consistent wavelength. Some of the more commonly used fluorescent dyes are Uranine (fluorescein), Eosine (Acid Red 87), Rhodamine WT, and Sulforhodamine-B (SRB).

Photo of Uranine Dye Injection

DID YOU KNOW?

-Some springs discharge as much as 10 million gallons a day which historically were used for early settlements, mills, and distilleries.

-Groundwater in limestone features can move like a river, sometimes miles per day, unlike slow movement through sediment and porous aquifers in other states.

-Many abandoned wells are hidden hazards, and open boreholes can funnel contaminations from the surface directly into aquifers.

- The Division of Water has an online dye-trace notification system to keep track of different dye trace results.

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Why is Dye Tracing Important?

Hundreds of thousands of Kentuckians rely on springs as their primary drinking water source. Springs are at high risk for contamination due to the karst networks that supply water to them. Water is stored in void spaces or conduits in the subsurface, throughout the year these conduits are supplied rain/stormwater via sinkholes, sinking streams, and other surficial karst features. These surface features provide little to no filtration for the stormwater as it enters the karst system, meaning that any chemical or contaminant that is transported in the stormwater will likely end up in the spring. Contaminants can range from bacteriological like *E. coli* to chemicals like pesticides, herbicides, and petroleum. Because of this, it is crucial to delineate or map out spring basins. Dye tracing allows for connections to be made from the surface, through the subsurface, to the springs they feed into. Combining the results of dye traces, along with other information (i.e. surface drainage maps, sinkhole drainage maps) we can more accurately estimate basin boundaries.

Many spring basins are also located near major highways and roadways. Thousands of large trucks travel these roads daily, many of which carry hazardous chemicals. When these large trucks wreck, they often result in spills. If a spill occurs near a sinkhole, the contaminants have the potential to move quickly into the karst system, it makes it especially impotent to know where those contaminants are going so the environmental and human health impacts can be minimized.

Photo of Lost River Rise, Bowling Green, KY

Ultimately, dye tracing is an important tool in better understanding the many karst systems in the commonwealth. Work is actively being done across the state, by various agencies and organizations, to expand upon existing dye trace studies and data.

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Quick Links

Water Well Drillers Certification:

https://apps.legislature.ky.gov/law/kar/titles/401/006/320/

Monitoring Well Construction:

https://apps.legislature.ky.gov/law/kar/titles/401/006/350/

Well Owner's Guide:

https://eec.ky.gov/Environmental-Protection/Water/Reports/Reports/2009-WaterWellOwnersGuide.pdf

Water Supply Well Construction:

https://apps.legislature.ky.gov/law/kar/titles/401/006/310/

Well Driller Certification Program:

https://eec.ky.gov/Environmental-Protection/Water/GW/Pages/GWDrillers.aspx

Well Record Information Map:

https://experience.arcgis.com/experience/cdacd3e110aa4ba188283c586513b303