

Well Installation Board News

The Well Installation Board held its quarterly meeting Thursday, May 21, 2015, in Rolla, Missouri. The Board received updates on program and section activities, rule development, legislation, and online services. Staff discussed apprentice permit requirements and gave a presentation regarding the educational, clear-cased well installed on the Missouri Geological Survey campus.

The next quarterly meeting is scheduled for 10 a.m., August 28, 2015, in the Mozarkite Conference Room at the Department of Natural Resources' Missouri Geological Survey, Annex Building, 1251 Gale Drive, in Rolla.

Rule Update

The Section continues to work to update rules.

The following rules are in initial development and stakeholder meetings have been completed:

- 10 CSR 23-1.010 – Definitions
- 10 CSR 23-1.030 – Types of Wells
- 10 CSR 23-3.110 – Plugging of Wells

Variance Rule 10 CSR 23-1.040 (Modification by the Division) – The Interagency Review was completed for this rule May 18, 2015, with no comments received from outside agencies. The proposed rule language currently is undergoing legal review. The next step is for the Well Installation Board to approve the draft language and file the rule with the Secretary of State's Office for publishing in the *Missouri Register* for public review and comment.

The Well Installation Board approved the "Finding of Necessity" for revision of 10 CSR 23-1.075 (Disciplinary Action and Appeal Procedures), and the proposed rule language is undergoing legal review. The next step is to file the rule with the Secretary of State's Office for publishing in the *Missouri Register* for public review and comment.

Staff are developing proposed changes to 10 CSR 23-3 Water Well Rules and plan to hold stakeholder meetings to review proposed language by fall 2015.

Updates to Chapter 4 Monitoring Well Rules, Chapter 6 Test Hole Rules, and Chapter 1 Permitting requirements are planned, with stakeholder meetings likely scheduled in 2016.

For more information, visit the Geological Survey Program's Rules in Development webpage at

dnr.mo.gov/geology/geosrv/geo-rules-in-dev.htm.

Available drafts of proposed rule revisions will be posted as well as upcoming stakeholder meetings.

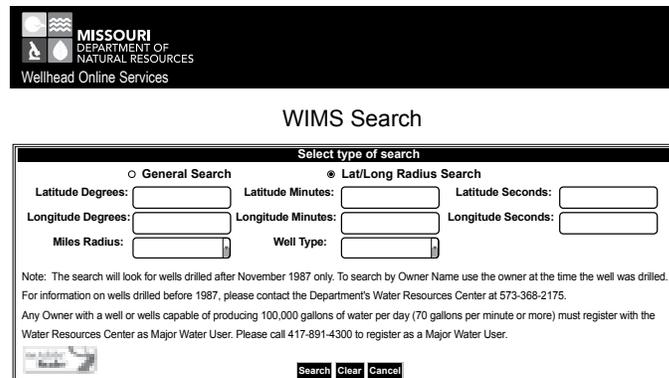
Permit Renewal Changes

The department is moving to a permit cycle in which all permits are due on the same date. Therefore, all well, pump and heat pump installation contractor permits will expire Oct. 1, 2015. This change will increase efficiency in state government and will be less confusing and cumbersome for companies that have multiple employees who hold permits that expire at different times during the calendar year. In order to begin this process, permit fees during the next year will be pro-rated to reflect the new expiration date. The total amount due will be noted at the bottom of all letters. Please submit the proper amount to the department.

Contractors are advised to renew permits before the expiration date. Failing to renew before the permit expires will result in a 40 percent late fee, if renewed within 30 days of expiration. Permits that have been expired more than 30 days will be cancelled. A contractor who continues working without a permit is in violation of 10 CSR 23-1.090. If a permit is cancelled, the permittee will have to re-apply for a permit, take the appropriate test, and may be required to post a bond and be required to prenotify all work for one year.

Radius Search

The Wellhead Protection section continues to make more services available online. A feature recently added to the Wellhead Online Services (dnr.mo.gov/mowells) is a latitude and longitude radius search. Located at the top of the page, one can use the general search or the latitude and longitude radius search. This allows contractors and members of the public to locate any well in the WIMS database surrounding a specific location. The area of the search can be increased by quarter-mile increments up to a distance of two miles. The search also can be refined by selecting the well type the user wants to locate.



MISSOURI DEPARTMENT OF NATURAL RESOURCES
Wellhead Online Services

WIMS Search

Select type of search

General Search Lat/Long Radius Search

Latitude Degrees: Latitude Minutes: Latitude Seconds:

Longitude Degrees: Longitude Minutes: Longitude Seconds:

Miles Radius: Well Type:

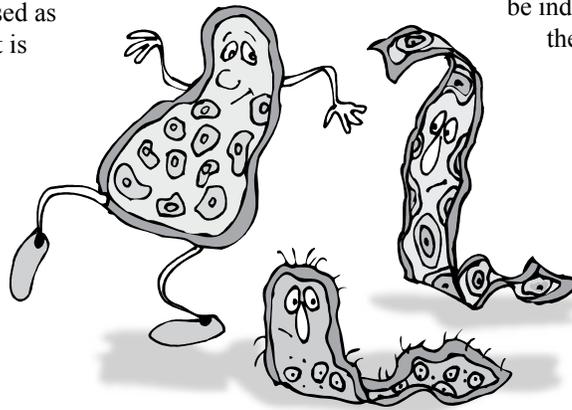
Note: The search will look for wells drilled after November 1987 only. To search by Owner Name use the owner at the time the well was drilled. For information on wells drilled before 1987, please contact the Department's Water Resources Center at 573-368-2175. Any Owner with a well or wells capable of producing 100,000 gallons of water per day (70 gallons per minute or more) must register with the Water Resources Center as Major Water User. Please call 417-891-4300 to register as a Major Water User.

What is Coliform Bacteria?

Bacteria are a diverse group of microscopic organisms; some having beneficial effects on the body, some neutral and others that can cause disease. In 1885, “*Escherichia coli*” or “*E. coli*” was identified by the German pediatrician, Theodor Escherich. *E. coli* bacteria are a member of the family Enterobacteriaceae, which includes such pathogens as *Salmonella*. While most strains of *E. coli* are not regarded as causative agents of disease (pathogens), there are strains of *E. coli* that can cause gastrointestinal illness in healthy humans when ingested. Depending on the age and health of the individual, the results of this illness can be fatal.

In 1892, the use of *E. coli* was proposed as an indicator of fecal contamination. It is widely distributed in the intestines of humans and warm-blooded animals, and usually is not found in other environments. *E. coli* also could be detected easily by its ability to ferment lactose. The presence of *E. coli* in food or water became accepted as an indicator that recent fecal contamination had occurred. While the concept was sound, it was complicated in practice as *E. coli* could not be separated readily from the presence of several other types of bacteria that also ferment lactose. As a result, the term “coliform” was coined to describe the specific group of rod-shaped anaerobic (existing in the absence of free oxygen) bacteria that produce lactose under specific conditions. In 1914, the U.S. Public Health Service adopted the count of coliforms as a standard of sanitary significance (FDA Bacteriological Analytical Manual, 8th Edition, Feng, Weagant and Grant).

Coliform bacteria are present in the general environment (soil and vegetation) as well as in the feces of all warm-blooded



animals. While most coliform bacteria likely will not cause illness, their presence in well water indicates that the more serious forms of fecal coliform (such as *E. coli*) also may be present (EPA Ground Water and Drinking Water Factsheet, 2007). Testing for total coliform bacteria is relatively quick and inexpensive, and is the usual first step. If total coliform is present, the sample is then tested specifically for the presence of *E. coli* or fecal bacteria. The presence of coliform bacteria in the well water indicates a contamination of the system may have occurred. This could be a specific incident such as a water line or faucet replacement, or it could be indicative of an ongoing problem such as the loss of integrity of the well seal. The presence of *E. coli* indicates that the contamination event has ties to a septic influence, either human or animal. A system inspection should be conducted to find and eliminate any possible sources of contamination, followed by “shock” chlorinating the system. Subsequent bacteria tests should then be taken to confirm the problem has been eliminated. Missouri Department of Health and Senior Services (DHSS) guidelines about water use should be followed until the problem has been corrected. These guidelines are available by contacting the DHSS sanitarian in your county or the DHSS State Public Health Laboratory at 573-751-3334.

Confirmation of fecal coliform bacteria or *E. coli* in a water well sample is indicative of recent fecal contamination. This may be from human or animal excrement and is an immediate health risk. Care should be taken in any contact with the water. DHSS guidelines about water use should be strictly followed until the problem has been corrected.

Receive Updates Via GovDelivery



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on this
Issue**

GovDelivery allows subscribers to receive updates about topics relating to Wellhead Protection. Multi-colored envelope icons are available on many of the department’s Web pages identifying this service. Individuals are able to create a personalized subscription list of content. When content changes, such as rule updates, GovDelivery sends an email or text alert informing subscribers. Get started at dnr.mo.gov/geology/geosrv/wellhd/ and click on the envelope, enter your email address or sign in using social media, and choose the topics for which you would like to receive updates.

Wellhead Protection Section Online Directory

- Missouri Well Construction Rules: sos.mo.gov/adrules/csr/current/10csr/10csr.asp#10-23
- The Department’s Website: dnr.mo.gov
- The Wellhead Protection Section Website: dnr.mo.gov/geology/geosrv/wellhd
- Online Well Information: dnr.mo.gov/mowells
- Wellhead Protection Section Email Address: welldrillers@dnr.mo.gov
- Rules in Development: dnr.mo.gov/geology/geosrv/geo-rules-in-dev.htm

Public Well Pump Test Requirements

Public water supply wells are divided into three categories: community wells, non-transient non-community wells, and transient non-community wells. Construction of these wells must follow Missouri's Well Construction Rules, administered by the Department of Natural Resources' Wellhead Protection Section (WHP), as well as design standards for public wells as determined by the department's Public Drinking Water Branch (PDWB). There are two design standards, one each for the community and non-community wells. The "Minimum Design Standards for Missouri Community Water Systems" were updated and became effective December 10, 2013. The "Standards for Non-Community Public Water Supplies" have been in effect as a rule since 1982, and revisions currently are in draft. Both non-transient and transient wells are included in the non-community design standards.

An important part of the construction of a public water supply well includes the completion of a pump test. These tests are analyzed by the department's Water Resources Center (WRC) to determine safe aquifer yields and potential interference between closely spaced wells. Formerly, the design standards required pump tests to be completed for ALL public water supply wells. However, the updated community standards and the draft proposed non-community standards include revised pump test requirements.

The following is a summary of these new requirements for community wells and proposed requirements for non-community wells:

- Pump tests are **REQUIRED** for all community wells completed in unconsolidated formations less than 300 feet in total depth regardless of casing size or community wells completed in unconsolidated formations greater than 300 feet in total depth with a casing diameter of eight inches or greater.
- Pump tests are **REQUIRED** for all community wells completed in consolidated formations whose casing diameter is eight inches or greater.

Lake Wells in Sensitive Area B

Lakefront property is very attractive and in high demand. As demand increases, developers may plot smaller lots in a development to increase the number of properties with shoreline. Smaller lots may pose problems when siting a new well. Setback distances sometimes cannot be met when trying to site locations for a well, septic system and a house. The problem often is compounded when accounting for the location of neighboring wells and septic systems.

When a suitable site for a well is found, drilling contractors must ensure that drilling fluids, cuttings and foam do not enter the lake, because they could violate water quality standards. "Waters of the State," defined as "All rivers, streams, lakes and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state," are subject to State and Federal Clean Water Laws and Regulations. Regulation 10 CSR 20-7.031(4) B states, "Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses."

- Pump tests are **OPTIONAL** for community wells that do not meet the above criteria.
- The 1982 version of the non-community design standards is still in effect, which requires pump tests for **ALL** non-community wells and does not give an option for pump test exemptions. In an effort to be consistent with community well pump test requirements, the department's agencies that assist with permits, construction, and inspections have entered into an agreement for waiving non-community well pump tests.

Similar to the new community requirements, this agreement allows for pump test exemptions for wells that meet specific guidelines. The criteria stipulated for community wells, as detailed above, applies to non-community wells with an added caveat. The well yield of the non-community well in question must be greater than the capacity of the pump installed in the well as reported on the Well Certification Record. If all of these criteria have been met and the Well Certification Record submitted to WHP, an exemption from the design standards pump test requirement may be requested by contacting the department's appropriate regional office. In turn, the regional office will forward this request to WRC, WHP and PDWB. If all agencies are in agreement, the pump test will be waived for the non-community well.

Engineers and well drillers should make a note of this policy when they are bidding for new public water supply wells. The optional pump test is included in the current community design standard and should be considered when developing plans for these wells without seeking an exemption from the department. While an exemption will not be granted prior to the construction of non-community wells, this option should be considered when submitting a bid for non-community well construction.

Questions regarding the pump test exemption process for non-community wells can be directed to Scott Kaden in WRC at scott.kaden@dnr.mo.gov or 573-368-2194.

Section C further states, "Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity."

Drilling contractors should adopt best management practices to reduce and control drilling wastewater on site. Containment basins, filtering devices or land application of wastewater is recommended. Containment basins and filtering devices (straw bales, filter cloth or synthetic membrane) reduce the amount of suspended solids and allow the discharge of clear water in a controlled manner. Land application is allowable provided landowner approval is obtained and the application rate is slow enough to prevent ponding, pooling or runoff. Water Pollution Regulation 10 CSR 20-6.010 (1) B (7), exempts the discharge of drilling fluids from all types of well construction from permit requirements provided pollution of waters of the state is not occurring.

For additional information contact your local MoDNR regional office: Kansas City 816-622-7000, Springfield 417-891-4300, Poplar Bluff 573-840-9750, St. Louis 314-416-2960, Macon 660-385-8000.

Glacial Drift Aquifer in Northwestern Missouri Groundwater Province

In Northwest Missouri, water from wells drilled into bedrock typically is too highly mineralized to be used for irrigation or livestock. Mineral concentrations become greater with depth and treatment of water from this source is expensive. Consequently, the prospects for obtaining usable groundwater are modest and are limited to the surficial aquifer system. Within this environment, the geology is complex and can vary significantly over short distances.

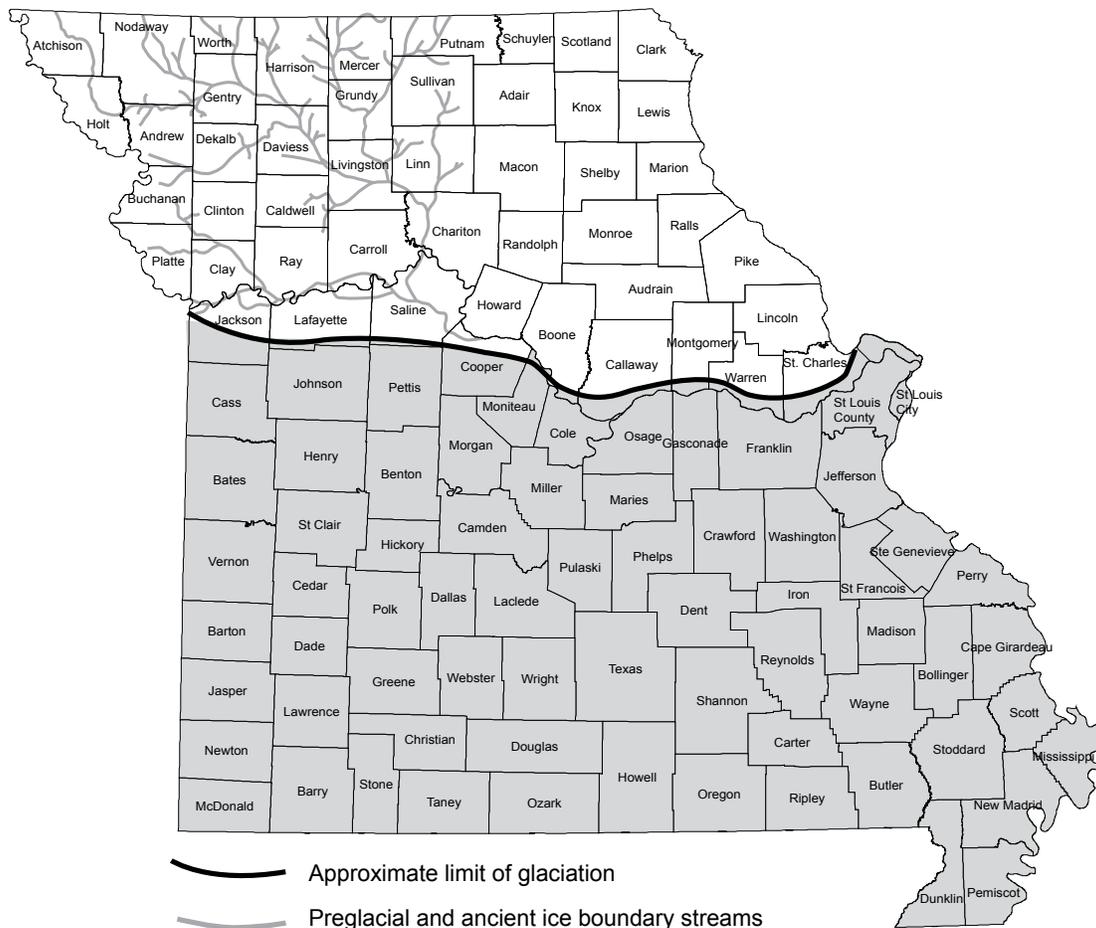
Drilling a well in Northwest Missouri that will produce an ample supply of groundwater largely is a function of luck. Where one location can produce a sufficient yield, a nearby well likely could produce nothing. In most of the region, the available groundwater occurs in channels filled with sand and gravel deposited by pre-glacial and inter-glacial streams that have since been buried in fine-grained and poorly-sorted deposits of glacial drift.

Advancing ice covered Northern Missouri and buried ancient stream channels that had been eroded into the bedrock. The thickest deposits of glacial drift occur in the northwestern part of the state. Most of the region is covered by 100 to 200 feet, but thicknesses can be greater than 300 feet. The volume of water produced is dependent on the thickness and composition of the surficial material that was laid down directly by the ice as fine-grained and poorly-sorted till or was deposited by

meltwater streams as gravel and sand alluvium. Over time, new drainage patterns developed over the unconsolidated glacial deposits. The meandering of meltwater streams across valley floors left deposits of sand and gravel surrounded by nearly impermeable clay and silt. The result is a thick and complex interbedding of coarse-grained and fine-grained material.

Because of the complex depositional environment, yields of water wells in Northwest Missouri can vary significantly within very short distances. Wells in this region commonly produce only one or two gallons per minute (gpm). However, it is possible to encounter a lens of permeable material that is completely surrounded by nearly impermeable silt and clay. In places where the wellbore has penetrated multiple thick beds of sand and gravel, yields can be as great as 1,000 gpm.

At many sites, it is necessary to drill test holes to locate the most productive zones. In the 1950s, Missouri Geological Survey and Water Resources staff conducted a test drilling program to assess the groundwater possibilities for the glacial drift aquifer in the Northwestern Missouri Groundwater Province. This project set out to identify areas that could yield sufficient amounts of water for domestic and agricultural use. These subsequent reports summarize and interpret the results on a county-by-county basis. The reports may be found at dnr.mo.gov/env/wrc/water_res_rpts.htm#Groundwater.



Welcome Contractors

The following individuals are now part of the Missouri Department of Natural Resources' permitted contractor community:

Aqua Wells Inc. – James Mallonee
Beasley Heating & Cooling – George Beasley
Bulldog Drilling – Chad Dutton
Cardno ATC – Brian Lieb
Cascade Drilling – Clinton Herron
Elliott Electric – Larry Elliott
Fox Heating & Cooling LLC – Adam Fox
Gingerich Well & Pump – Dillon Gingerich
Leggette, Brashears & Graham – Cassandra Puletapuai
MoDNR – Andrew Combs
Odyssey Environmental – Steven Venios, Jeffrey Zelko
Robertson Inc. – Chad Wyatt
Smith & Co. – Felix Deken
Winkler Plumbing & Heating – Chad Winkler

Welcome Apprentice Contractors

The following individuals are now part of the Missouri Department of Natural Resources' permitted apprentice contractor community:

AAA Drilling LLC – Casey Williams, Sara Asmus
Ark-MO Well Drlg – Benjamin Jordan
Boessen Underground – Curtis Verdot
Brotcke Well & Pump – Shane Crites, Michael Hemmer, Jason Sikes
Huston's Pump Service – Nathan Anderson, Brian Massa
Industrial & Petroleum Env – James Shumard, Cody Reno, Jacob Miller
Pelton Pump – Jessica Angell

Contractor and Apprentice Well and Pump Installation Testing Schedule

All tests begin at 9 a.m.

The following 2015 testing dates are scheduled at the Missouri Geological Survey, Annex Building, 1251 Gale Drive, Rolla.

Aug. 12, 2015	Nov. 18, 2015
Sept. 16, 2015	Dec. 9, 2015
Oct. 14, 2015	

Testing dates may be modified if necessary.

Please bring a picture ID with you to the testing site.

If you are applying for a non restricted permit, please be sure to bring your global positioning unit (GPS) and operating manual to the test site. Your GPS unit should be programmed to read in degrees, minutes, and seconds in accordance with 10 CSR 23-3.060(5).

If you have questions concerning this schedule or testing please call 573-368-2450. Persons with disabilities who may require special services may contact Jeannie Hoyle at the number above.

Farewell

The people addressed below are no longer permitted to operate as contractors according to the Water Well Drillers Act and Missouri Well Construction Regulations:

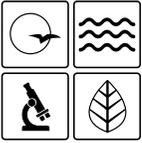
Accu-Temp – Ivan Norton
Anderson Bros Htg & Cooling – John Anderson
Antea Group – Kimberly Pundmann
APEX – Josh Van Winkle
Aqua Wells – Robert Martin
Antons Air Cond & Heating – Craig Denton
Bowers & Associates – Craig Bowers
Brotcke Well & Pump – Steven Allen
Burns & McDonnell – Gary Schnell, Gregory Nieman
C & S Heating & Cooling – Cloyd Swetnam
Environmental Works – Ryan Thurman
Flynn Drilling – Adam Cattell, Andy Ferguson
Hardy's Sales & Service – Chris Hardy
Lefty's Pump & Drilling – Kyle Murray
Maas Electric – Michael Maas
Major Drilling Env – Wesley Casteel, Erik Jenks
MoDNR – Christy Miner
Moretrench American – Vernon Thrasher
Ridge Runner – Aaron Brooks
Risco Welding & Farm – Jimmy Hortiz
Russom Irrigation – Wilkie Russom
Schroeder Rotary Drlg – Chris Williams
Sunbelt Environmental – Jim Fels
Terracon – Jonathan Reber, Karen Rieken
Venture Drilling – Jackie Green

Funding Available to Plug Abandoned Water Wells

The department administers grant programs that offer financial assistance for the plugging of abandoned water wells. A well is considered abandoned when it can no longer be used or when it has not been in use for two years or more. Abandoned wells can pose a serious physical hazard, especially to children and animals. Contaminants also can enter our groundwater through these wells.

Public Drinking Water Branch grants to plug abandoned wells are available to municipalities, public water supply districts and other regulated water systems. Learn more at dnr.mo.gov/pubs/pub2443.pdf. Soil and Water Conservation Program grants are available to private citizens. The primary funding for these cost-share practices comes from the one-tenth-of-one-percent parks, soils and water sales tax. Learn more and locate your local district office at swcd.mo.gov.

Anyone who encounters an abandoned water or oil well is encouraged to contact the Department of Natural Resources' Missouri Geological Survey by calling 573-368-2100 or by using the "Report an Environmental Concern" form. The form is available at dnr.mo.gov/concern.htm. A fact sheet about plugging abandoned water wells is available at dnr.mo.gov/pubs/pub2281.pdf.



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Missouri Geological Survey
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Staff Website: dnr.mo.gov/geology/geosrv/wellhd/job.htm
Well Online Services: dnr.mo.gov/mowells/

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- **Vacant– Processing Unit Chief**
Information regarding pending enforcement letters, permitting and testing.
573-368-2174
- **Andrew Combs – Environmental Specialist**
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- **Airin Haselwander - Geologist**
Public Water Systems, pilot holes, casing depths and variances.
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- **Eric Hohl – Technical Assistant**
Water well construction and certification information and abandonment registration information.
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- **Jeannie Hoyle – Permitting Clerk**
Permitting, testing and apprentice information.
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- **Lori Miller – Correspondence Clerk**
Matching of well and pump records, correspondence requesting information.
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- **Brad Mitchell – Geologist**
Field investigation, well construction information, variances and casing depths.
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- **Karen Smith – Section Secretary**
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