



VOLUME 22 NUMBER 4 MISSOURI DEPARTMENT OF NATURAL RESOURCES FOURTH QUARTER 2015

Well Installation Board News

The Well Installation Board held their quarterly meeting Friday, August 28, 2015. The Board received updates on program and section activities, rule development, the current fee structure, online services and fiscal year end totals. Fees for Fiscal Year 2016 will not change.

The November 6, 2015, meeting was canceled. The next quarterly meeting is scheduled for 10 a.m. February 15, 2016, in conjunction with the Missouri Water Well Association's annual convention. The meeting will be held at Tan-Tar-A Resort in Lake Ozark.

Apprentice Signature

At the May 2015 Well Installation Board meeting, the board listened to an issue involving apprentice signatures on well and pump records and how credit should be given to a person's apprenticeship numbers. The issue discussed was if a company has more than one apprentice with the same type of permit working on the same job site essentially performing the same type of work, who should receive credit? Can all apprentices sign the well or pump record and receive credit? The board made a decision to allow only one apprentice to sign and receive credit toward their apprenticeship. However, if an apprentice has more than one kind of permit, for example a water and pump, and if two apprentices are both working at the same job site, one apprentice can sign for credit as the apprentice driller and one can sign for credit as the apprentice pump installer, provided that is the work they performed. The department tracks how many "installs" are credited to an apprenticeship and sends a monthly report to the permit holder. If the apprentice finds an error on this report, please notify the Wellhead Protection Section at 573-368-2165.

Receive Updates Via GovDelivery

GovDelivery allows subscribers to receive updates about topics relating to Wellhead Protection. Multi-colored envelope icons are available on many of the department's



**Get Updates
on this
Issue**

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.

Online Test Now Available for Restricted Permits

A new and exciting feature has been added to the well online services. Persons applying for a restricted permit or an apprentice permit now have the ability to take and pay for the general exam online. This feature has been added as a convenience to save contractor's time and money as the applicant will no longer be required to take the test in person at the department's location in Rolla.

The link to the exam can be found on the Well Online Services Web page at dnr.mo.gov/mowells. To access the exam, you must have a valid Test ID from the department and your Social Security number. Once you log on, you will be able to review your information, send an email to Section staff with any updates, choose the type of permit for which you are applying, and complete a contractor or apprentice application.

The test is composed of multiple choice or true or false questions, and the system provides a link to the Missouri Well Construction Rules for your convenience. Once the test begins, you will have 24 hours to complete the exam without having to reapply. You will have the option of reviewing your answers before submitting the exam. You will receive your score via email, and if needed, you can retake the exam.

A score of 70 percent is required to pass the exam. If successful and you are applying for a restricted permit, you will be directed to the online store where you will be able to pay for your permit and submit the required information from the contractor application. Staff will review your information, and if approved, a permit number will be issued and your permit will be mailed to you.

If you are applying for an apprentice permit and receive a passing score, you will be directed to the apprentice application where you can download the file and either print the application or save it on your computer. You must complete the application, obtain the signature of the responsible party for your apprenticeship, and submit it along with your permit fee to the Missouri Geological Survey. After the information is reviewed and approved, your permit will be issued and mailed to you.

This new feature will make compliance more convenient for contractors and hopefully will be an asset to the drilling industry. If you use the online system, please let us know what you think. Contact Sheri Fry at 573-368-2115 with questions or comments.

Watch for new items on our Web page at dnr.mo.gov/geology/geosrv/wellhd/.

PCB Contamination Potential from Older Submersible Well Pumps

What are PCBs?

Polychlorinated biphenyls, or PCBs, are synthetic (man-made) chlorinated hydrocarbons similar to pesticides. There are no known natural sources of PCBs. They generally are colorless to light yellow, odorless, tasteless, have a thick consistency, high density, are insoluble in water and immobile in soils. Some PCBs are volatile and may exist as vapors in air. Because of their low electric conductance and insulating properties, they were used extensively as dielectric fluids in electrical capacitors and transformers. PCBs were also used in hydraulic fluids, plasticizers, fire retardants, and as a component of carbonless copy paper. The manufacture of PCBs was banned by the EPA in 1976, and most uses of PCBs were banned in 1979.

How do PCBs contaminate the well water?

The failure of seals within certain submersible pump motors due to normal wear, lightning strike, electrical power surges or other damage can release PCB-tainted oil into the household drinking water system. Capacitors within the motors of certain two-wire submersible pump models manufactured before 1980 contain PCBs, which can leak into the surrounding lubricating oil. Oil can slowly leak from an oil-cooled submersible pump motor without notice by the homeowner. The leak may not be apparent until the pump fails and the well is serviced.

By the time that the oil leakage is discovered, water tainted with PCB contamination may have already been consumed. In the case of a lightning strike, oil can be released suddenly from the pump motor which can cause an immediate change in the taste and odor of the drinking water. In most cases, the oil is not discovered until the well pump is pulled due to the low density of the oil and the fact that the floating oil rises to the top of the water column where it accumulates on the well casing, the pump pipe and the pump wire. The oil slowly mixes with the well water, and the submersible pump distributes the tainted water into the pressure tank and throughout the household plumbing.

What are the health risks from PCB exposure?

The United States Environmental Protection Agency (USEPA) notes that PCBs have the potential to cause short-term health effects such as acne-like eruptions (chloracne) and pigmentation of the skin, hearing and vision problems, and spasms. Long-term exposure above the 0.5 parts per billion maximum contaminant level (MCL) can cause irritation of the nose, throat and gastrointestinal tracts, and changes in liver function. PCBs are known animal carcinogens (cancer-causing) and probable human carcinogens. Few studies associated PCBs with cancers of the liver and biliary tract in workers. PCBs bioaccumulate in the body, primarily in the liver and fatty tissue. PCBs collect in milk fat and can be passed to infants through breast-feeding. There is no evidence of structural birth defects caused by PCBs, but motor skill deficiencies and a decrease in short-term memory have been implicated in children born to mothers who ate PCB-contaminated fish. PCBs have been very common in

our environment and almost all adults born before 1980 have had exposure to PCBs. This is due to the wide use of devices that included PCB compounds as dielectric materials such as glass, plastics, porcelain (ceramic), mica, and the oxides of various metals. PCBs do not break down naturally in the environment and can persist for years.

Submersible Pump Units Known To Contain PCBs

Dempster Industries: Before 1964 Dempster may have distributed pump units manufactured by REDA and Sta-Rite that may have contained PCBs. Use the REDA and Sta-Rite identification data for those pump units.

F.E. Myers: Models SF and SF-2, 2-wire units manufactured from 1964 through 1970 in 1/3 to 1 horsepower (HP) and Models SG and S2G, 2-wire units manufactured from 1970 through 1976 in 1/3 to 1 HP with date codes prior to 1976. Some SX2 models manufactured before 1979 had capacitors containing less than 50 parts per million of PCBs. The date code is located on the motor casing and on a nameplate or tag in the format MMY (Example: "1177" = November 1977).

Fairbanks Morse: Two-wire units manufactured from 1964 through January 1979 gave a coded alpha-numeric date code found on the nameplate. Included are the Colonial series and the Chateau series units with date codes of A, B, C, J, K, L, M, N, P, R, S, T, V, W, X and DA. The blanks are filled in with additional characters.

Series Model Numbers

Colonial A2-2507 C2-3306 E2-7509 G2-1009 A2-3309
C2-7511 E2-10011 A2-5012

Chateau A2S-3309 C2S-3306 E2S-7509 G2S-1009 273
A2S-5012 C2S-5008 E2S-10011 G2S-15012 275 A2S-7517
C2S-7511 E2S-15015 277 A2S-10021 C2S-10014

Johnston Water Systems: These pumps were manufactured by Peabody Barnes and are identified as noted under Peabody Barnes listing. Models include: V507-31 V513-52 V909-51 VSP913-75 V317-150 V507-32 V523-100 V909-52 VSP909-52 V1306-51 V509-31 V531-100 V913-75 VSP909-51 V1307-52 V509-32 V906-31 V917-100 VSP1309-75 V1809-100 V513-51 V906-32 V923-150 VSP313-100 V1813-150

Montgomery Ward: These pumps were manufactured by Peabody Barnes from 1962 to 1972 and are identified as noted under Peabody Barnes listing. Models include: 3677A 3679A 3681C 3682E 3684D 24623 3677B 3679B 3681D 3683C 3675A 24625 3678A 3680C 3682C 3683D 3675B 3678B 3680D 3682D 3684C 3675C

Peabody Barnes: Two-wire units are identified with the le number (Example: "409W52"). In 1977, the letter "N" was added to the model number (Example: "409W52" became "409WN52"). The date codes are the last 3 or 4 digits of the coding, showing month, then year of manufacture (Example: "409WN52-67753-1279" is a 2-wire unit made in December 1979). Codes are found on a stainless steel band around the discharge neck of the pump.

Continued on page 3

REDA: Two-wire units have a date code on the nameplate with the format MMY (Example: “0877” is August 1977). All models listed below with a year code of 1979 or earlier are included. All motors had the serial number stamped on the head of the motor preceded by the 4-digit date code.
 41100 41101 41120 42070 42090 42091 42121 42131 42171
 42181 42251 43091 43121 43131 43171 43181 44091
 43251 4D35P101 6D35P151 7D9P030 7D9P031 7D18P071
 9D5P031 9D6P030 9D9P050 9D9P051 10D18P101 12D5P050
 12D5P051 12D9P071 14D18P151 17D5P071 17D9P101
 23D5P101 23D9P151 312X7P050 14X4P050 320X4P050
 32D5P151

Red Jacket: The capacitor is encapsulated in a plastic housing and the unit is fastened to the bottom of the motor. Although these units may be less likely to leak PCBs, there are confirmed well contamination cases from Red Jacket pump motors. Motor models include designations “BV,” “BVC,” “W” and “RW,” 1/3 through 1-1/2 HP. The model designation appears as the first part of the identification number (Example: BV 300-2 or 50W0-9BC). The date of manufacture is found on the motor

housing and on the pump and include the following codes:
 1968 MC and NC 1969 AD through ND
 1970 AE through NE 1971 AF through NF
 1972 AG through NG 1973 AH through NH
 1974 AK through NK 1975 AL through NL
 1976 AM through NM 1977 AN through NN
 78 (Examples: “20378” is 2nd week of March 1978)
 “3FHR” is 3rd week of June 1973.

Sta-Rite: Two-wire units have a date code on the nameplate with the format MYY. The month is coded as a letter from “A” to “M” and the year is a number. (Example: “B77” is February 1977). Units dated 1979 or earlier are included.

(Note: Some 3-wire motors with Sta-Rite labels have been verified containing PCB.) (Source: Wisconsin Department of Natural Resources)

This list is not all-inclusive. Other pumps may contain PCBs.
 Source: Iowa Department of Natural Resources

Staff News

Karen Smith Promoted to Processing Unit Chief



Karen Smith recently accepted the position of Processing Unit Chief with the Wellhead Protection Section. Karen officially began her duties August 19, 2015. She began working for the section in June 2011 as an Office Support Assistant. In July 2013 she was promoted to Section Secretary upon retirement of

Debbie Stogsdill. According to Karen, “I am very excited about taking on the challenges involved with the operation of the Wellhead Protection Processing Unit. I feel honored to have been chosen for this promotion and am grateful for the outstanding staff in the Wellhead Program.” Karen can be reached at 573-368-2174.

Radius Search

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.

WIMS Search

Select type of search					
<input type="radio"/> General Search		<input checked="" type="radio"/> Lat/Long Radius Search			
Latitude Degrees: <input type="text"/>	Latitude Minutes: <input type="text"/>	Latitude Seconds: <input type="text"/>			
Longitude Degrees: <input type="text"/>	Longitude Minutes: <input type="text"/>	Longitude Seconds: <input type="text"/>			
Miles Radius: <input type="text"/>	Well Type: <input type="text"/>				

Fiscal Year 2015 Totals

Records Received

Water Wells	2,839
Pumps	1,312
Reconstructions.....	142
Well Pluggings.....	1,788
Heat Pumps.....	602
Monitoring Wells.....	1,413
Total	8,096

Compliance and Enforcement

Compliance Assistance	
Visits	52
Administrative Cases (forms or fees)	164
Administrative Case Resolved	169
Administrative Letters of Warning	58
Field Cases	65
Field Cases Resolved	42
Field Letters of Warning	5
Heat Pump Prenotifications	397
Heat Pump Installations Witnessed	8
Permit Prenotifications Received	41
Permit Prenotifications Witnessed	8
Lost Well Sites Inspected	33
Wells Verified as Lost	73
Wells Found and Plugged	17

Online Submittals

Water Wells	21
Pumps	40
Reconstructions.....	5
Well Pluggings.....	218
Heat Pumps.....	35
Monitoring Wells	158
Permit Renewals	223
Total	700

New Permits Issued

Water Well Permits	23
Pump Permits	29
Monitoring Well Permits.....	46
Heat Pump Permits	24
Apprentice Permits Issued..	33
Total	155

Public Contacts

Sunshine Requests	1,100
Incoming E-mail	2,245
Incoming Calls	6,850
Incoming Mail	12,523
Educational Presentations..	38
Totals	22,756

Miscellaneous

Variations Issued	162
Casing Depth Requests...	172
Tests Administered	114
Public Water Supply	
Notifications	128

Pitless Unit vs Pitless Adapter

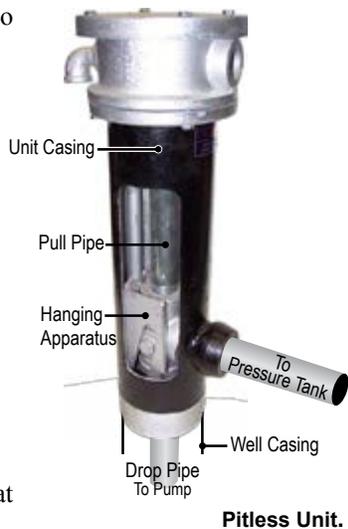
What is the difference between a pitless unit and a pitless adapter? These two terms can sometimes mistakenly be interchanged. While either is permissible for construction of domestic, multi-family and high yield wells, only the pitless unit is allowed for the use in a public well. This includes community, non-transient non-community, and transient non-community wells. This restriction is stipulated in the Missouri Department of Natural Resources' Public Drinking Water Branch's "*Minimum Design Standards for Missouri Community Water Systems*" (effective December 10, 2013) and "*Standards for Non-Community Public Water Supplies*" (1982).

Pitless units and adapters are so named because they allow the connection between the pump drop pipe and pipe running to the pressure tank to be made below the frost line.

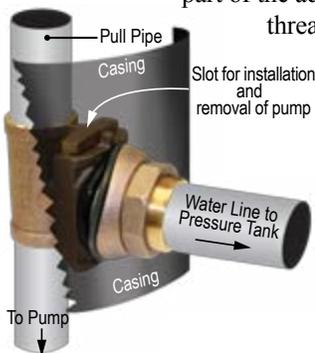
This eliminates the need for construction of a well house, concrete vault or pit (thus the term "pitless") to protect the water line from freezing as it comes out of the well. The difference between a pitless unit and a pitless adapter is that a pitless unit includes a short section of well casing that is connected to the top of the primary well casing below the ground. A pitless adapter, on the other hand, uses the primary well casing as its housing. Both allow for the easy removal of the pump because the connection between the drop pipe and the line running to the pressure tank slides apart as the drop pipe and pump are hoisted out of the well.

Pitless units are connected to the well casing by welding, threading or with a compression connection. They must be ordered with specific size and type of connections needed to mate up with the well casing and outlet piping on your particular job. The hole through which water is pumped from the well is part of the unit.

Pitless adapters are installed by drilling or flame-cutting a hole in the side of the well casing, and attaching the stationary part of the adapter to the hole by welding, threading or clamping. The movable



Pitless Unit.



Pitless Adapter.

part of the pitless adapter is threaded onto the top of the drop pipe, and is attached to the stationary part by sliding it into a slot or hole. O-ring seals are used to provide a watertight joint.

Pitless units are much larger and stronger than pitless adapters, and are **REQUIRED** for construction of public

water supply wells. Pitless adapters are allowed to be installed in domestic and multi-family wells but not for public wells for several reasons. Public wells typically have larger pumps installed at deeper depths creating more stress on the pitless connection because of increased weight. Secondly, larger pumps create more torque on the drop pipe which again creates more stress on the pitless connection. Thirdly, public wells frequently are disinfected by chlorination causing corrosion and may weaken a pitless adapter. When installing either a pitless unit or adapter, care should be taken to make sure the specifications for the equipment are sufficient to support the weight of the drop pipe and pump.

GeoSTRAT Updates

In previous *Connection* issues, the Department of Natural Resources highlighted its Geosciences Technical Resource Assessment Tool, or [GeoSTRAT](#). The following are updates and changes to the application. The foremost change is



that as of September 1, 2015, Google is no longer supporting the 3-D plug-in; therefore, the GeoSTRAT interactive map will not function in Google Chrome. The map will continue to function using Internet Explorer or Firefox Web browsers. DNR soon will be releasing a 2-D platform for the map that will load faster and provide additional benefits that will be announced later.

New and existing layers will provide additional information. The "Wells" layer file, which is based on the Well Information Management System ([WIMS](#)) data, is updated annually, along with the other layers. Recently added layers include the locations of and information about Missouri's oil and gas wells. Clarifications to the "Drill Areas" layer are being added to make it more user-friendly. New layers showing the Special Area 1C and Special Area 2 requirements will be revised.

As always, if you have internet access, this tool makes geologic and hydrologic data available to citizens, contractors, industry representatives and others online, 24/7. GeoSTRAT can be used to locate wells, drilling areas, geologic logs and much more using the interactive map. Data can be downloaded in formats compatible with a variety of free and commercial mapping software, including Google Earth.

Give it try! Visit this website dnr.mo.gov/geology/geostrat.htm and proceed to GeoSTRAT. For example, turn on the "Certified wells" layer and type your address, a city, county or Zip code in the upper right box, hit the zoom button, and click on individual wells to learn more about them. Well type, use, reference number and construction records can be viewed easily.

For additional information about GeoSTRAT, contact the Missouri Geological Survey at 573-368-2100.

Welcome Contractors

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

AAFC Heating & Cooling – John McCormick
Balke Pump Service – Justin Balke
Compton Irrigation – Paul Allen, Larry Compton
Design Aire Inc – Daniel Flynn
Environmental Works Inc – Gregory Stark
Knight Heating and Air – Christopher Knight,
Matthew Obernuefemann, Russell Carter
Lafser & Associates – Daniel Broeckling
MoDNR – Ryan Seabaugh
Ozark York Heating & Air – Robert Lutgen
Pence Heating & Cooling LLC – Willard Pence II
Ramboll Environ US Corp – Nicholas Zurweller
Robertson Contractors Inc – David Stinson
Schroeder Rotary Drilling – Bradley Vanmeter
Superior Environmental – David Mokma

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 spring 2016.

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

Welcome Apprentice Contractors

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

Lefty's Pump & Drilling – Kyle Lebow, Tucker Moore
MODNR – Andy Stivers, Eric Troutt, Ethan Musick

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:

Aecom Environment – Robert Lewis
Brett Richter
Burns & McDonnell – Thomas Moriarty
CBC Drilling – Larry Boles
David Schnell Drilling – James Weston
Dustin Thoenen
HDR Engineering – Lisa O'Dell
J J Contracting LLC – John Dickman
James Weber
Jeffrey Caneer
Jeremy Wall
Keith Brown
Kennedy/Jenks Consultants – Eric Mosley
Lafser & Associates – Roger Riemann
Lebanon Pump & Drlg – Robert Burns
Mann Drilling – Donald Smith
Midwest Drilling – J Brian Wilson
MODNR – Douglas Thompson, Ben Frissell,
Pam Hackler, Jiayi Liu
PSI – Sherri Jones
Rouse Sheet Metal – Morris Rouse, Matthew Rouse
Ryan Thurman
Schutjer Heating & Cooling – Larry Schutjer
Shannon & Wilson – Russell Schwab
Stantec Consulting – Joshua White
Terracon – Kory Armstrong

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.

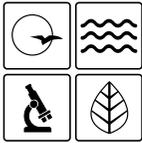
Nov. 18, 2015 Dec. 9, 2015

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.



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 Missouri Geological Survey
 Wellhead Protection
 PO Box 250
 Rolla, MO 65402-0250

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<p>Wellhead Protection Section Staff 573-368-2165</p>	<p>Staff Website: dnr.mo.gov/geology/geosrv/wellhd/job.htm Well Online Services: dnr.mo.gov/mowells/</p>
<ul style="list-style-type: none"> • Kyle Rollins – Section Chief Management of section, regulations, policy and rulemaking. 573-368-2171 • kyle.rollins@dnr.mo.gov • Justin Davis – Investigation and Remediation Unit Chief Field investigation and remediation, variances, casing depths, well construction and abandonment information. 573-368-2167 • justin.davis@dnr.mo.gov • Sheri Fry – Compliance and Enforcement Regulations, enforcement, policy, rulemaking and legislation. 573-368-2115 • sheri.fry@dnr.mo.gov • Karen Smith – Processing Unit Chief Information regarding pending enforcement letters, permitting and testing. 573-368-2174 • karen.smith@dnr.mo.gov • Andrew Combs – Environmental Specialist Field investigation, well plugging, heat pump records. 573-368-2159 • andrew.combs@dnr.mo.gov • Airin Haselwander - Geologist Public Water Systems, pilot holes, casing depths and variances. 573-368-2196 • airin.haselwander@dnr.mo.gov 	<ul style="list-style-type: none"> • Eric Hohl – Technical Assistant Water well construction and certification information and abandonment registration information. 573-368-2168 • eric.hohl@dnr.mo.gov • Jeannie Hoyle – Permitting Clerk Permitting, testing and apprentice information. 573-368-2450 • jeannie.hoyle@dnr.mo.gov • Lori Miller – Correspondence Clerk Matching of well and pump records, correspondence requesting information. 573-368-2318 • lori.miller@dnr.mo.gov • Brad Mitchell – Geologist Field investigation, well construction information, variances and casing depths. 573-368-2116 • brad.mitchell@dnr.mo.gov • Matt Parker – Geologist Field investigation, well construction, Special Area 2, variances and casing depths. 573-368-2170 • matt.parker@dnr.mo.gov • Vacant – Section Secretary General information, fee letters, requests for forms and publications. 573-368-2165 • Vacant – Office Support Assistant General information, data entry and receptionist. 573-368-2375

The Connection is published by the Missouri Department of Natural Resources' Missouri Geological Survey. Suggestions, ideas and comments concerning this newsletter are welcome. Send comments to: Missouri Department of Natural Resources' Missouri Geological Survey, Wellhead Protection Section, PO Box 250, Rolla, MO 65402-0250, phone: 573-368-2165 or fax: 573-368-2317.