

## **Managing Private Water Systems in West Virginia**

Greg Hamons, WVU Extension Agent, Agriculture and Natural Resources, Pocahontas County

Georgette Plaucher, former WVU Extension Oil and Natural Gas Education Program Coordinator, Agriculture and Natural Resources

Many rural residents in West Virginia rely on private water systems (water wells, springs or cisterns) to supply their household with water. According to a 2008 U.S. Geological Survey study, 42 percent of West Virginians depended upon groundwater for their domestic water supply. Twenty-three percent of that groundwater came from privately owned wells and 19 percent was from public-supply wells. Proper management of groundwater supplies is critical to ensure that drinking water is safe and reliable for all groundwater users.

Managing private water supplies are the homeowner's responsibility and are not regulated by the Safe Drinking Water Act or the West Virginia Department of Health and Human Resources Source Water Assessment and Protection Program. Most homeowners are unaware of proper design, construction, testing and treatment of their private water supply. While there are regulations for the initial construction and location of water wells, use and proper management is entirely voluntary once a water supply is constructed. This guide is to help promote proper management and protection of your private water supply following its construction.

### **Where does the water in West Virginia come from?**

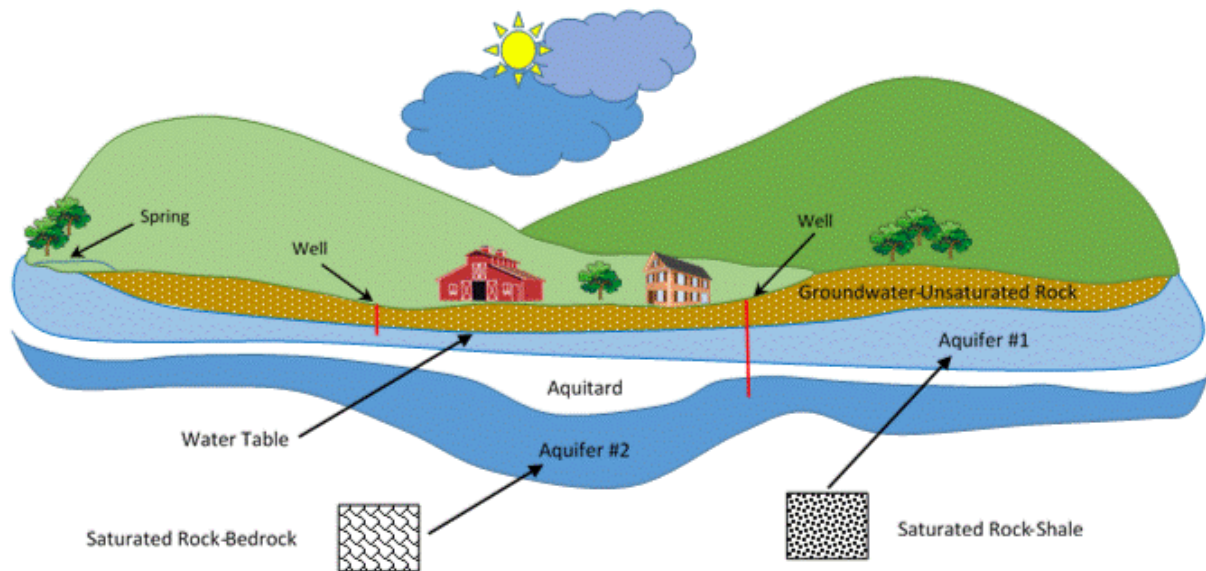
Water is available as precipitation (rain and snowfall), runoff (rivers and streams), impoundments (ponds and lakes) or groundwater (wells and springs). While each of these sources may be used as a water supply for public and private systems, the most reliable source of water for private water systems comes from groundwater.

Groundwater is precipitation that is not lost to runoff, evaporation or plant root absorption. It is water that slowly filters or infiltrates down through layers of soil and unsaturated rock until it reaches a layer of saturated rock in a process called recharge. The layer of saturated rock is known as the aquifer. The dividing line between the aquifer and the unsaturated rock is known as the water table (Figure 1). The level of groundwater in the aquifer rises closer to the ground surface during wetter times and falls deeper below the ground surface during dry times. The aquifer may be shallow or deep, and there may be one or more aquifers at varying depths. Multiple aquifers are divided by an impermeable geologic formation called an aquitard that restricts movement of water between aquifers.

Three types of aquifers occur in West Virginia:

- Sand and gravel (along the Ohio River and Kanawha River)
- Sandstone and shale (found in all regions)
- Carbonate, also known as limestone (found in the eastern and southeastern parts of the state)

To withdraw water from an aquifer, drilled water wells are used. Although common in the past, hand-dug wells are rarely used for drinking water due to their susceptibility to contamination. Depending on which part of West Virginia you live in, if you have a private water well you are utilizing one of these three types of aquifers.



*Figure 1. Accessing groundwater aquifers through wells location. Source: Georgette Plaucher, WVU Extension Service.*

## **Are there requirements for private water systems in West Virginia?**

There are no state requirements for water testing, maintenance or treatment of private water supplies in West Virginia. Since water in West Virginia is owned by the state, there is no private ownership of water. But, reasonable use of water is allowed. Those regulations simply allow landowners to access and use surface and groundwater as long as that use is considered reasonable. Disputes about reasonable uses of water are most often settled by courts. Existing sources of water, both ground and surface, have little protection. Those with the greatest ability to capture and use water get the biggest supply. For example, the deepest well and biggest pump win.

There are no requirements for the construction of private springs and cisterns. However, there are requirements for the location of private water wells. Pursuant to WV Code 64-46-4, Location 4.2.a., “the required minimum horizontal distance between a water well, other than a well serving a public water system, and a source or potential source of pollution or contamination” shall be as follows:

*Table 1. West Virginia requirements for locating private water wells*

<i>Source of pollution</i>	<i>Minimum distance of source from well</i>
Septic tanks	50 ft. (100 ft.)
Sewage treatment facilities	200 ft.
Sewers and drains (water tight)	10 ft.
Drains (non-water tight)	50 ft. (100 ft.)
Sewage holding tanks and privies (vault)	50 ft. (100 ft.)
Barnyard feeding and watering areas	100 ft.
Streams, rivers and impoundments	25 ft.
Sewage absorption fields	100 ft.
Existing building or foundation	10 ft.
Storage or preparation area for fertilizers and pesticides	150 ft.
Buried oil, gasoline, chemical storage tanks	50 ft. (100 ft.)
Cemetery	50 ft. (100 ft.)
*Numbers in parentheses shall be required when a water well is lower in elevation than the source of pollution or contamination referenced. Source: WV Code 64-46-4, Location 4.2.a.	

## What types of private water systems exist in West Virginia?

There are wells (groundwater), springs (groundwater or a mix of surface and groundwater) and cisterns (rainfall). Properly constructed wells are the most reliable source of private water. Springs are the most unreliable source as they are susceptible to drought and bacterial contamination. Cisterns are common in areas with low (deep) water tables or polluted groundwater. Cisterns rely entirely on rainfall, so they may be unreliable during droughts, requiring water to be trucked in to fill the cistern tank. All three types of private water systems should be properly constructed and require appropriate treatment and regular maintenance. Examples of each system are provided in Figures 2 to 4.

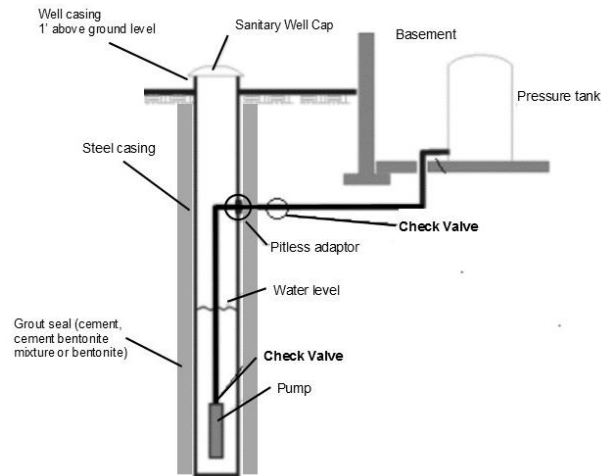


Figure 2. Properly constructed water well. Source: West Virginia Department of Health and Human Resources Bureau for Public Health Office of Environmental Health Services.

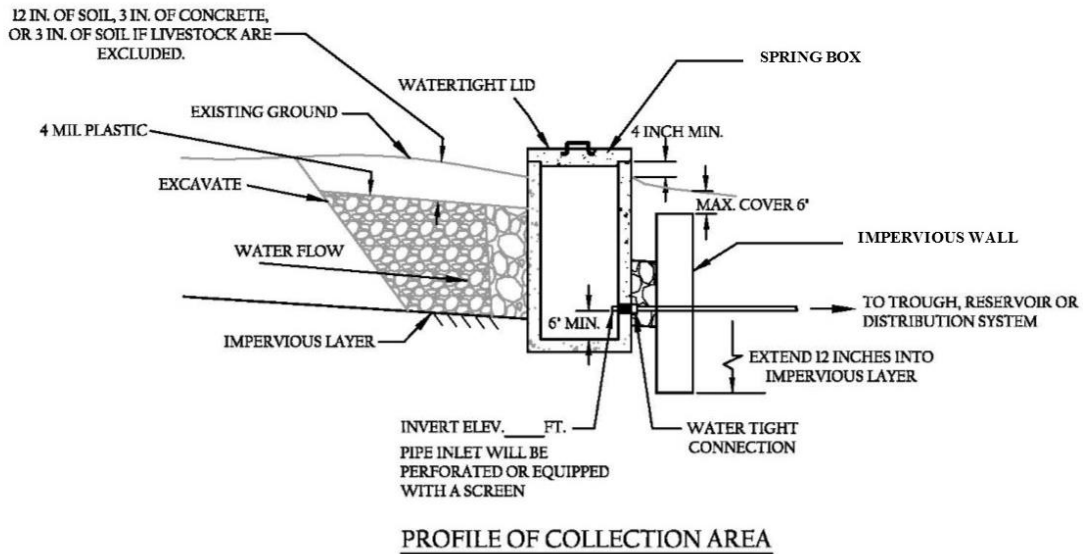
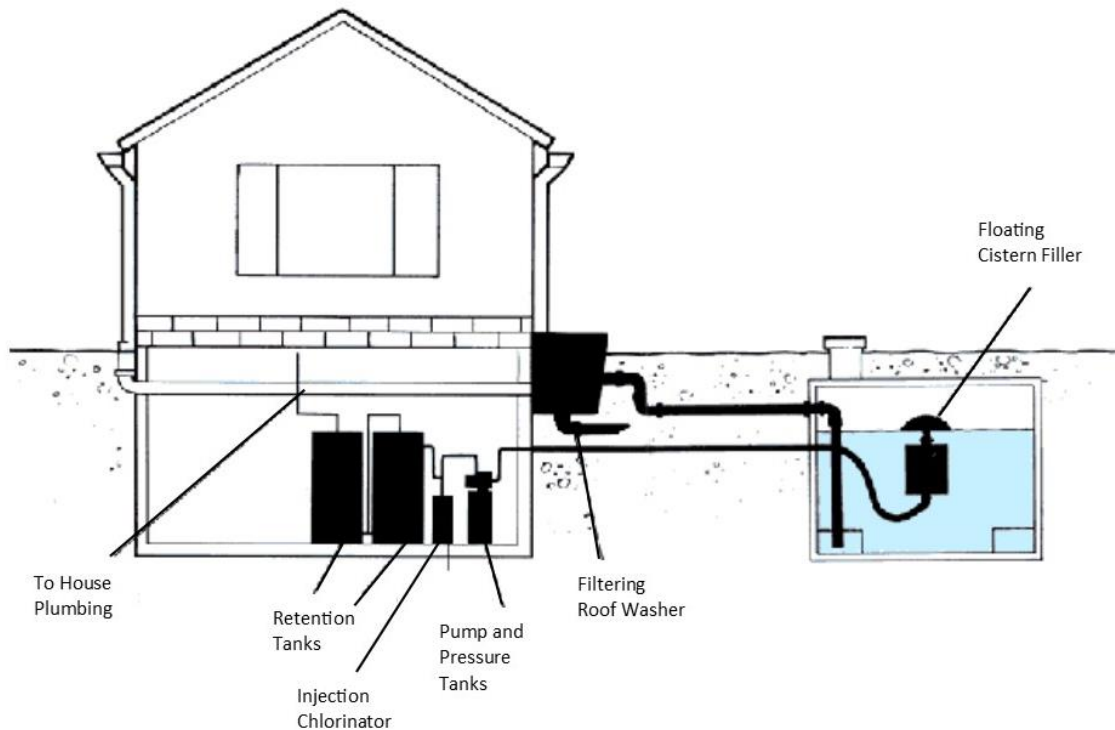


Figure 3. Properly constructed fresh water spring. Used with permission from the Natural Resources Conservation Service, File No. 374.



*Figure 4. Properly constructed cistern water source. This water treatment system utilizes a filtering roof washer and floating cistern filter. Used with permission from the Water Filtration Company, Marietta, OH.*

## How close can oil and gas wells be to my private water supply?

The West Virginia Department of Environmental Protection Office of Oil and Gas is responsible for monitoring and regulating all actions related to the exploration, drilling, storage and production of oil and natural gas. They maintain records on more than 50,758 active and 14,000 inactive oil and gas wells, and they manage the Abandoned Well Plugging and Reclamation Program in West Virginia. Regulations under the authority of WVDEP OOG contain provisions for the protection of surface water and groundwater from oil and gas activities.

There are three main pieces of legislation in the West Virginia Code that give the WVDEP OOG this primary regulatory authority over oil and gas wells. They are:

- Oil and Gas Wells (vertical wells) and Other Wells in Chapter 22, Article 6 and Legislative Rule Title 35, Series 4

- Horizontal Well Control Act (horizontal wells), Chapter 22, Article 6A and Legislative Rule Title 35, Series 8
- Underground Injection Control wells in Chapter 22, Article 11 and Legislative Rule Title 47, Series 13

So, the answer to “how close is too close?” depends on the type of oil or gas well being drilled. Wells can be vertical or horizontal and different regulations occur for each.

Vertical wells are those covered under Article 6 and horizontal under Article 6A in Chapter 22 of the West Virginia Code. The article’s provisions state that the act shall apply to “any natural gas well, other than a coalbed methane well, drilled using a horizontal drilling method, and which disturbs three acres or more of surface, excluding pipelines, gathering lines and roads, or utilizes more than two hundred ten thousand gallons of water in any thirty day period.” To be more specific, horizontal wells are most commonly associated with oil and gas exploration in the Marcellus and Utica Shale formations.

Vertical oil and gas wells cannot be drilled within 200 feet and horizontal wells within 250 feet (Figure 5) of a private water well or spring used for human or domestic animal consumption. However, if your drinking water supply is within 1,000 feet of a proposed vertical or 1,500 feet of a horizontal well, you may want to have your water tested.

Prior to drilling, exploration companies are required to notify you of your right to have your water sampled and tested if you are in the previously mentioned ranges and then to conduct the sampling and testing at your request. When requesting your water be tested, ensure that it is tested at a state-certified water quality laboratory that guarantees a chain of custody. If you would ever need to take legal action regarding an impact on your water supply, a chain of custody would provide documentation of the movement and location of your water sample from the time it was collected, tested and presented in court. This ensures that proper procedures were followed and that the results of the tests were not tainted and are accurate.

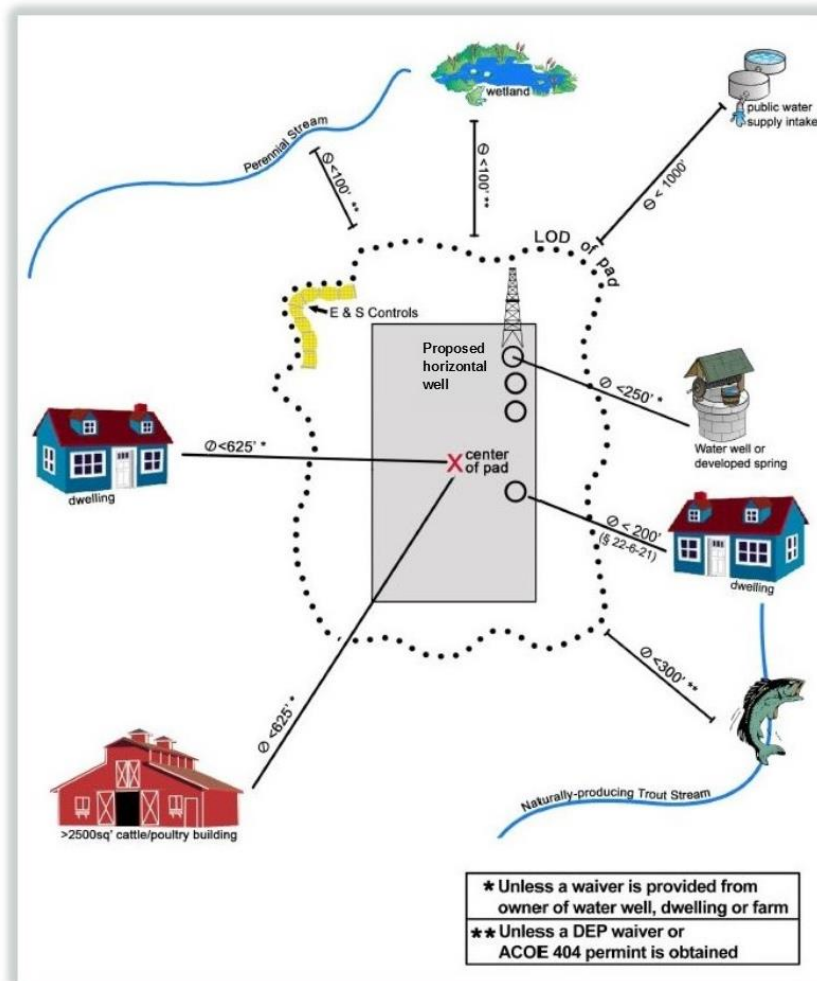


Figure 5. Natural gas well location restrictions required by the West Virginia §22-6A Horizontal Well Control Act. Source: West Virginia Department of Environmental Protection, Office of Oil and Gas.

## How do I know if an oil or gas well will be drilled near my water supply?

The drilling and location of new and existing permitted oil and gas wells in West Virginia is publicly available. However, there are also many known and unknown abandoned oil and gas wells throughout the state, with some dating back to the 1850s. To determine if oil and gas wells are proposed in your area you can:

- Look for notices in your local newspaper for new horizontal and injection control well permits.

- Visit the WVDEP OOG's Database and Map Information Page to access oil and gas production data, well location data and a list of abandoned wells. The site is updated daily and can be accessed at: <http://www.dep.wv.gov/oil-and-gas/databaseinfo/Pages/default.aspx>.
- Subscribe to any or all of the WVDEP OOG's mailing lists to receive current news, notices about permits that are open for comment and horizontal natural gas well work permits. You can sign up for these lists at: <http://www.dep.wv.gov/insidedep/Pages/DEPMailingLists.aspx>

## How do I protect my private water supply?

Since you are responsible for protecting your private water supply, you should develop a source water protection plan for both existing and new water sources. The first thing is to note the location of all developed water supplies and ensure they are not serving as pathways for water contamination. Second, you need to identify and remove potential sources of pollution that could be impacting your water supplies. A general rule of thumb is to not have anything within 100 feet of a well head, spring box or cistern that you don't want to drink. Refer to Table 1 to identify sources of pollution, keeping in mind that additional things, such as fertilizer applications and stored vehicles, may also be potential sources of contamination. Third, you should annually inspect your water supplies, removing new sources of pollution, conducting proper maintenance and making repairs as needed.

### Existing Water Sources.

For wells, the plan should include closing all abandoned water wells (hand dug and drilled) and upgrading or closing improperly constructed drilled wells. For springs and cisterns, inspect them to ensure they are properly constructed and make repairs or upgrades as needed.

### New Water Sources

When constructing new wells, the most recent West Virginia Water Well Design Standards should be followed. In 2008 the standards were updated, and are available at local health departments and online at: <http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=8590&Format=PDF>. Of importance in these new standards is that well casings be located 12 inches above ground, be installed to proper depth, be properly grouted or concreted, contain a properly installed pitless adapter unit and contain a sanitary well cap (bug and rodent proof) (Figure 2). Following proper construction, you should also regularly inspect all exposed parts of your well, looking for cracks, corrosion or damage to the well casing and cap. If developing a spring or installing a cistern system, use recommended construction methods and materials.

Be sure to hire certified well drillers or pump installers for new construction, modification of existing wells and properly closing abandoned wells. West Virginia has a Water Well and Pump Installer Certification Program which maintains a database of current certified water well drillers and pump installers in the state who are up to date on their certification, liability insurance and contractor bond. To access this database, you can contact your county health department or visit the WVDHHR website at:

[http://www.wvdhhr.org/oehs/eed/swap/training&certification/waterwell/all\\_drillers.asp](http://www.wvdhhr.org/oehs/eed/swap/training&certification/waterwell/all_drillers.asp).



Finally, your plan should include testing your water supply annually for coliform bacteria and every three years for pH, total dissolved solids and other contaminants related to land uses adjacent to the water supply (mining, agriculture, gas drilling, etc.). For example, if you live in close proximity to a coal mining operation, you might want to add iron, manganese and sulfate to your water testing list every three years. If incidents such as flooding, chemical spills, soil disturbance, new construction or other disruptions, have occurred that may have impacted your groundwater or surface water supply, have your water tested as soon as possible following the incident.

There are many private certified water testing laboratories you can use to test your water for contaminants. Your county health department may also be able to test your water for certain bacteria but will not test hand-dug wells. The WVDHHR Environmental Chemistry Laboratory can conduct additional tests, and offers oil and gas pre-drilling sampling kits to test your water prior to natural gas drilling for chemicals, such as arsenic and total organic compounds. They can also test for other water quality issues, such as pH and total dissolved solids. Note that there are fees associated with testing, which vary by laboratory.

## Where can I go for more information and assistance?

- \* Center for Disease Control and Prevention-Drinking Water: <http://www.cdc.gov/healthywater/drinking/index.html>
- \* National Groundwater Association: [www.wellowner.org](http://www.wellowner.org)
- \* Natural Resources Conservation Service-West Virginia: <http://www.nrcs.usda.gov/wps/portal/nrcs/site/wv/home/> or 304-284-7540
- \* PennState Extension Water Quality-Drinking Water: <http://extension.psu.edu/natural-resources/water/drinking-water>
- \* United State Geological Survey Groundwater Information: <http://water.usgs.gov/ogw/>
- \* West Virginia County Health Departments: <http://www.dhhr.wv.gov/localhealth/Pages/default.aspx>
- \* West Virginia Department of Environmental Protection: <http://www.dep.wv.gov> or 304-926-0440
- \* West Virginia Department of Health and Human Resources: <http://www.dhhr.wv.gov> or 304-558-0684
- \* West Virginia Water Research Institute: <http://wvri.org/> or 304-293-4974

### Who Controls and Regulates Public Water Systems in West Virginia?

In 1996, amendments made to the Safe Drinking Water Act required each state to establish a Source Water Assessment Program and submit the plans to the United States Environmental Protection Agency by February, 1999. These assessments were completed by the WVDHHR as the West Virginia Source Water Assessment and Protection Program.

SWAP assists public water suppliers in protecting sources of drinking water, such as streams and aquifers, from contamination. This voluntary program addresses approximately 1,000 public drinking water systems that provide a reliable supply of safe drinking water to approximately 1.5 million individuals in West Virginia.

All public water systems throughout the United States must test their water supplies annually and submit the results to the United States Environmental Protection Agency to determine if they meet safe drinking water standards. Results of water testing are published in a Consumer Confidence Report available to all customers.

#### Sources:

Certified Water Well Drillers in West Virginia:

[http://www.wvdhhr.org/oehs/eed/swap/training&certification/waterwell/certified\\_drillers.asp](http://www.wvdhhr.org/oehs/eed/swap/training&certification/waterwell/certified_drillers.asp)

Cisterns. West Virginia Department of Health and Human Resources, Public Health Sanitation Division.

[http://www.wvdhhr.org/phs/forms/SW-252d\\_Cisterns.pdf](http://www.wvdhhr.org/phs/forms/SW-252d_Cisterns.pdf)

Natural Gas Horizontal Well Control Act (2012), Chapter 22, Article 6A and Legislative Rule Title 35, Series 8 (2012). <http://www.legis.state.wv.us/WVCODE/Code.cfm?chap=22&art=6A>

Oil and Gas Wells and Other Wells (2010), Chapter 22, Article 6 and Legislative Rule Title 35, Series 4.

<http://www.state.wv.us/admin/personnel/jobs/exam/oilGasStudy/35-4%20NEW%20RULE%20OIL%20AND%20GAS%20WELLS%20AND%20OTHER%20WELLS%2035-04.pdf>

Private Water Well Owners—Water Well Pumping Systems. West Virginia Department of Health and Human Resources Bureau for Public Health Office of Environmental Health Services fact sheet.

<http://www.wvdhhr.org/phs/water/Fact%20Sheets/PrivateWaterWellOwners%E2%80%93WaterWellPumpingSystems.pdf>

Spring Development Field Sheet, File No. 574, Drawing-Spring. West Virginia Natural Resources Conservation Service.

Springs. West Virginia Department of Health and Human Resources, Public Health Sanitation Division.  
[http://www.wvdhhr.org/phs/forms/SW-252c\\_Springs.pdf](http://www.wvdhhr.org/phs/forms/SW-252c_Springs.pdf)

State of West Virginia Source Water Assessment and Protection Program, West Virginia Department of Health and Human Resources. Bureau for Public Health, Office of Environmental Health Services, Environmental Engineering Division. <http://www.wvdhhr.org/oehs/eed/swap/swapdoc.pdf>

Underground Injection Control (2002), Chapter 22, Article 11 and Legislative Rule Title 47, Series 13.  
<http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=22413&Format=PDF>

U.S. Geological Survey, Groundwater Atlas of the United States: Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, and West Virginia. [http://pubs.usgs.gov/ha/ha730/ch\\_1/index.html](http://pubs.usgs.gov/ha/ha730/ch_1/index.html)

USGS Groundwater Quality in WV 1993-2008, <http://pubs.usgs.gov/sir/2012/5186/pdf/sir2012-5186.pdf>

West Virginia Department of Health and Human Resources, WV Center for Local Health:  
<http://www.dhhr.wv.gov/localhealth/Pages/default.aspx>

West Virginia Water Laws, Water Regulations, and Water Rights. West Virginia Department of Environmental Protection. [http://www.dep.wv.gov/WWE/wateruse/Documents/WV\\_WaterLaws.pdf](http://www.dep.wv.gov/WWE/wateruse/Documents/WV_WaterLaws.pdf)

West Virginia Water Well Design Standards.  
<http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=8590&Format=PDF>

*Reviewed by: James Martin, Chief of the West Virginia Department of Environmental Protection, Office of Oil and Gas; Bryan Swistock, Penn State Cooperative Extension Senior Extension Associate; Water Resources Coordinator, Richard Shaver, Geologist III WVDHHR, BPH, OEHS, Source Water Assessment Program; and Dr. Paul Ziemkiewicz, Director of the West Virginia Water Research Institute.*

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For more information contact: Greg Hamons, WVU Extension Agent-Pocahontas County, [Greg.Hamons@mail.wvu.edu](mailto:Greg.Hamons@mail.wvu.edu); 304-799-4852. [www.ext.wvu.edu](http://www.ext.wvu.edu).

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