

Private Wells Q and A

These Answers were generously prepared for the Vashon-Maury Island Groundwater Protection Committee by Bob Seibold of Island Pump. They are based on the online Q and A forum from February 2021

Generic Questions

1. Q: What in your experience are the most common water quality issues that well owners encounter?

A: Common water quality issues can be either health related or aesthetic in nature. The most common potential health related issue is due to an unacceptable bacteria test result. A bacteria sample will be tested for total coliform, not a health concern in itself, but if found then a second test for E. coli is run. E. coli does pose a serious risk to health. Only a small percentage of failed bacteria tests do not pass the E. coli test. Arsenic is a chemical found occasionally in ground water samples and while slow to act it is a serious concern. Arsenic is regulated by the EPA, which lowered the maximum contaminant level about twenty years ago. Arsenic in well water is primarily due to its presence in the rocks and soils of the aquifer the water is drawn from and not because of the Asarco plume. The Asarco arsenic is tied up in the top foot or less of soil and typically not found in groundwater. Removal of arsenic from well water is fairly straightforward but expensive. The most common aesthetic problems in well water are due to iron and manganese. These can cause taste, odor and staining. While there are many ways to treat for these, a simple water softener or a greensand filter can do a very effective job of removing these chemicals. Hydrogen sulfide is also fairly common and results in a “rotten egg smell”. It is also fairly easy to remove. If a well has one of these chemicals, it is likely that the others are present to some degree.

2. Q: What are the most common causes for a drop in capacity or flow?

A: In no particular order, these are exceeding the flow rate the well is able to sustain, a leak in the system piping, a faucet left on by mistake, clogging of the faucet screens or a well pump that is mechanically failing or clogging.

3. Q: What's the most important maintenance well owners should perform in order to keep their wells functioning properly and their water safe?

A: In order to maintain a safe and properly functioning well system, owners should inspect the actual well head occasionally for a tight-fitting cap with a properly screened vent. Check the area on the ground around the steel casing to be sure there is no space developing between the casing and the ground. Hand dug, shallow wells and springs have their own list of potential problems, depending on construction. Verify that there is a well-sealed cover with screened venting and lightly clear the area next to the source. If your system has a large storage tank, check the cover for a tight fit and a screened vent. The water well industry recommends

having your water tested for bacteria once a year or any time you notice a change in color. Any system with a pump should be monitored for unusual surges or changes in pressure or volume. A sudden increase in the electric bill could be an indication of a leak or a pump that is wearing out. Fast cycling of the pump is the most common service complaint.

4. Q: What are the most common parts of the system that fail? And what's the best way to prevent those failures? What are some common indicators of trouble?

A: Pressure switches and well pump control boxes are the most common parts to fail. A failing pressure tank can lead to fast cycling of all the electrical components, including the well pump motor, leading to premature failure of those parts. A “surging” of pressure seen in the house or a rapid clicking of the switch is an indicator.

5. Q: How long should I expect my system to last?

A: A properly designed and installed system using quality parts will last for many years with very little attention needed. Water quality and amount of use play a large part in system longevity. Well pumps and pressure tanks typically last 15 to 25 years with pressure switches and well pump control boxes being shorter lived.

Questions submitted in advance

- **Q: How often should our water be tested at the well?**

A: Water is typically not tested at the well but, depending on the purpose of the testing, is usually tested at the point of use such as a kitchen sink or other appropriate place. It is recommended that bacteria be tested once per year.

- **Q: I live in a Homeowners Association neighborhood and we are currently switching from an unchlorinated system to one that is going to be using chlorinated and greensand. We are concerned that the water leaving the main distribution point will still have chlorine in it. We are concerned due to chlorine's effect in the ecosystems.**

It is understood that we can remove the chlorine to our homes but are wondering if the irrigation water will be safe. Do you know if this type of chlorination stays in the water?

A: The level of chlorine used in most treatment systems is very low. A greensand filter system will typically produce a chlorine residual of about 0.2 ppm leaving the equipment. Most public water systems that chlorinate maintain a chlorine residual of between 0.8 and 1.0 ppm in our drinking water. The most common way to remove chlorine after it has served its purpose in a greensand system is to run the water through an appropriately sized carbon filter. Wetland and surface water ecosystems are highly affected by chlorine at any residual. Discharge of chlorinated water, at any level, to these systems is unacceptable and illegal.

- **Q: What can I do to filter out manganese and iron that lead to brown slime formation in my pipes and toilets, clog my drip and soaker hose irrigation etc. (not to mention discoloring my drinking water and making it impossible to launder any whites)?**

A: Manganese and iron can cause very troublesome staining, taste and odor problems. There are many ways that purport to remove these chemicals, but it seems that a simple water softener or greensand filter can do an effective job.

- **Q: We have a Group B 14 share water system, on a well 325 feet deep, with a water column about 150'-175' above the pump, using an auto-chlorinator, with an 8000-gallon storage tank. 4 questions:**

1. **We haven't cleaned out our water storage tank in 8-10 years, used to do it every year, always greenish tint to water at households. Still OK, assuming regular testing of chlorine residuals?**

2. **How often and/or why ever do we use the end-of-line blow-off valve, which is at the end of a 2500 foot 2" main?**

3. **Other than saving money for failure, anything we can do to maintain the 25-30-year-old deep-well pump?**

4. **Does any agency (DOE, Vashon Groundwater?) know who else is on the aquifer we are drawing from, so we can compare notes of best practices?**

A: It is recommended that storage tanks be cleaned as needed to prevent any sediment from entering the system. An inspection of the tank should be done as needed depending the quality of water the well produces. A well that has a problem with manganese and also chlorinates will probably produce sediment from the oxidation of the manganese by the chlorine and may need more frequent cleaning. A greenish tint to the water itself, not the fixtures, is probably due to tannins. Blue-green staining of the fixtures is due to staining by copper from low pH water. The end of the line blow off valve is there to flush the line as needed or to drain the system for repairs. Maintaining a deep well pump is limited to being sure its controls are operating properly so that on/off cycles are maximized, unnecessary water use is minimized, and your replacement fund is topped off. The Washington State Dept. of Ecology is probably the best source for aquifer information.

- **Q: "Is there an unsafe level for sulfur bacteria in home water from a private well? The water where I live tastes absolutely awful, cannot be used for cooking because it imparts a taste in food, and when aerosolized in the shower stinks up the entire house, and yet the internet suggests that there is no harm, just disgust. Is this accurate?"**

A: Sulfate bacteria in well water produces a "rotten egg smell" that can be very strong and hard to live with. It does not appear to be a health threat and it can be removed by several treatment methods.

- **Q: How do you know when your filtering system needs parts replaced? When testing water, other than arsenic what is good to test for?**

A: As long as a water treatment system is being properly maintained and the water quality issues it was designed to treat don't reappear, the system is operating properly. If the treatment system was installed to treat health related issues such as bacteria and arsenic, tests should be done a regular basis determined by the system installer. A yearly inspection, including testing, can be provided by your system installer.

Chat questions

- **Q: Who do you recommend to test our water?**
A: Testing well water for health-related issues should be done by state certified labs such as Water Management Labs and Spectra Labs in Tacoma. Be sure to check with them first since some tests have specific bottles and methods required. Google “testing labs” in Seattle or order online for other options. Aesthetic water concerns can be tested by a lab or a water treatment contractor such as Northwest Water Treatment Inc. Island Pump Inc. can sample and deliver to off island labs.
- **Q: Are these issues with iron, manganese, hydrogen sulfide concentrated in areas on this island or is it widespread?**
A: Iron, manganese, hydrogen sulfide and arsenic problems can be found just about anywhere on the island but there are areas that seem to have concentrations. You’ll know if you’re in an area with iron, manganese or hydrogen sulfide problems by just using your water. Arsenic must be tested for by a lab.
- **Q: We put our pump in 12 years ago. We have screens but we do not have a water filter on our pump. The water was tested and it came back fine. It tastes and smells fine. But it is almost green. Why is our water green? Why does the water leave behind a goldish brown residue?**
A: A green color to the water itself is probably due to tannins. Drilled wells sometimes penetrate layers of organic material buried during interglacial periods. Groundwater moving through these layers can pick up tannins. A brownish residue left from water sitting in a container may be oxidized iron. An at-home test for this would be to fill a clear container with water. The water may be clear initially but is oxidized when exposed to air. Leave the container on the counter overnight and without disturbing the glass check to see if there is a dusting of brownish orange particles on the bottom in the morning. If so, you have iron in solution in your well water.
- **Q: When drilling for water, what's the likelihood of not hitting water or having to go so deep that it's a huge cost? How much does that vary around the island... are there places that are a problem and others where it's not a problem? Around Town?**
A: When drilling a well there is always the chance that water is unavailable at your chosen location. Success rates on new wells is pretty good in general but there can be huge variations in flow, depth and quality over fairly small distances. Checking with neighbors, the DOE website for records of wells in your neighborhood and with reputable drillers for their opinion based on their experience and the DOE site is a good idea.
- **Q: What is happening when the well water suddenly turns orange, with no warning?**
A: A sudden change in water color may be due to damage to piping or equipment, a hole in the well pump drop pipe below the water table surface, an earthquake or a sudden increase in flow which can disturb iron deposits lining the pipe walls.

- **Q: Can you describe the way that you maintain a pressure tank keeping it from water logging and often. Once a year?**

A: A properly functioning pressure doesn't need too much attention. Watch for a change in the amount of time the pump runs when it starts and how long it's off when it cycles. The ideal is at least one minute each although there is some flexibility in that time. To check the tank precharge, the amount of air pressure in the tank, turn the pump off electrically, drain the water pressure to zero and use a tire gauge to check air pressure in the tank at the Schrader valve, generally at the top of the tank. The air pressure should be about 2 to 3 psi below the turn on pressure of the pump. Turn the power back on and expect to flush any disturbed sediments. Checking the tanks once a year is a good recommendation.

- **Q: A number of years ago, our electricity usage suddenly increased; we found, when you pulled the pump riser that it was badly perforated. age of the system was 30 years. What was the likely cause?**

A: The most likely cause of holes in the well pump drop pipe is corrosion. Switching to heavy duty, SCH. 120 pvc pipe, eliminates that possibility.

- **Q: What are the best steps to taking a bacteria sample at the kitchen faucet; what should be disinfected, how long should it run, etc.?**

A: When a lab is testing a bacteria sample, even one bacterium detected results in a failed test. While the sampling is not difficult, it can be complicated. The sample should represent the water and not the sampling point., Read the instructions on the back of the lab form, or better yet, check the State Dept. of Health's website for more complete instructions. Taking a sample from the kitchen sink is not recommended, especially if the faucet is movable. The flexible joint at the base of the faucet can harbor bacteria. The simplest faucet possible is the best sampling point because it can be sterilized with a torch. A laundry faucet, non-movable, or an outdoor faucet without a vacuum breaker usually work well. A sprayer faucet at the kitchen sink can be disassembled to the point where the water is spraying from the small tube in a very directed way. Soaking the tube end in a 1 to 4 bleach to water ratio for at least a half hour can help.

- **Q: How about the fluctuation in the height of the aquifer? Is that likely?**

A: I believe that the top of the aquifer does vary seasonally, especially in shallower aquifers. I how much and when depends on many factors. Just because it's the rainy season at the well head doesn't mean the water level in the 300-foot aquifer is at its highest. There is a lag time as the rain falling on the surface makes its way to the aquifer. In general, the deeper the aquifer, the longer it takes rainfall to get there. Very shallow aquifers react much more quickly.

- **Q: If you are considering purchasing a property with a private well (built in 1983), how would you approach? Would you do an in-person inspection, or just bacteria testing?**

A: When purchasing a property with a private well, bacteria testing should be done as a minimum. I typically recommend that testing should include bacteria, nitrate and arsenic. These three tests are what King Co. Health requires for approval of a new home. Inspecting plumbing fixtures for staining and running the water into a glass while

sniffing for any odors is a good way to detect hydrogen sulfide. Inspecting the system for any apparent maintenance issues is recommended. A review of the sale disclosure agreement for flow or quantity concerns is important.

- **Q: What is the buddy's name you mentioned who has 40 years in the water treatment business?**

A: Water treatment recommendation: Glenn Karn, Northwest Water Treatment Inc., nwwatertreatment.com, 253 630 7177

- **Q: How do you test your water for bacteria?**

A: Bacteria tests are run by a state certified lab using their specific bottles and timeline.

- **Q: How about using a "soft start" circuit to power the well pump?**

A: "Soft start" systems are intended to reduce the surge of electricity demand of pump motor startup. Some electric utility companies require the use of this equipment on large horsepower systems and may allow reductions in billing costs when these systems are used. This type of system is a little easier on motors but unnecessary for most single-family domestic uses. The pump industry seems to be heading this way but the complicated nature of the equipment, the relatively short life and the cost of replacement leads me to recommend simple mechanical control for small domestic systems. When the cost of the electronic control is about the same as a new pump and the lifespan is probably half that of a standard pump motor, I believe they should be reserved for larger systems.

- **Q: My main storage tank has a high amount of brown manganese/iron slime coating it. Should this be cleaned out? How and how often?**

A: A storage tank with deposits of manganese/iron slime can be rinsed out with a strong spray from a hose or pressure washer. A small pump in the tank will pump out the sludge. The cleaning should be done often enough to avoid the slime collecting in the tank bottom and ending up out in the system. Treatment prior to the tank will eliminate the issue.

- **Q: Can you talk about shallow versus deep wells on the island? are there differences in water quality and safety? Do deep wells have less bacteria generally?**

A: My understanding of the difference between shallow wells and deep wells, and the comparison between the two, of the movement of bacteria and chemicals is limited. I can only assume that the finer the soil, the less saturated the soil and the greater the distance, fewer bacteria will be present. Shallow wells are defined by King County as any well that is less than 50 feet deep. All modern wells, whether shallow or deep, are required to be constructed with a bentonite clay surface seal which fills the annular space between the 6-inch steel casing and the oversized hole created by the drilling process. In general, the deeper a well, the longer percolating groundwater has to dissolve chemicals from the formations it is passing through leading to deeper wells having potentially more of a problem with water quality. Older, hand-dug, generally large diameter and shallower wells are much more susceptible to bacterial contamination due to having to protect the large opening and they sometimes are not cased

allowing burrowing animals access.

- **Q: How can you get information on your well if it's not listed in the county or state logs?**

A: Wells with little to no information on file can sometimes be sounded to determine depth to the water level, the bottom and the location of the screen. Sometimes the pump may need to be pulled to allow access. A well can be pump tested to determine flow.

- **Q: We stop getting water when the power goes out. If there is a major disaster and power is out for days/weeks, any advice for the best/safest way to get water from our (enormous) storage tank?**

A: Accessing water from a large storage tank is best done by installing a drain valve/faucet near the bottom of the tank or in the pump suction line. Most tanks have fairly large lids so a clean bucket could bail water from the top.

- **Q: Can you explain a little more how exactly we would engage someone to test our water or do it ourselves? Where would we get information on sampling and how to do it? Should we ask you or one of the other people you mentioned on the island to do it? How much does that cost and what does it include?**

A: Sampling water for testing can be done by the owner or others. There are several people that provide that service, including Island Pump. The drinking water section of the WA State Health Dept website has good information on sampling techniques. Island Pump charges \$95 to sample the water, deliver the samples to the lab and handle the paperwork.

- **Q: So, what drillers do you recommend now?**

A: We are recommending Arcadia Drilling and Tacoma Pump and Drilling. Both provide a quality product and good service from our experience. They both have websites.

- **Q: We are thinking of letting neighbors use the water from our well (irrigation only). But we want to monitor the amount they use. Can we use a meter to determine usage?**

A: Monitoring the quantity of water used is best done with a water meter.

- **Q: As a sole source aquifer, there's concern about running out of water. Have you heard from well owners about their water levels dropping and concern about water availability? Any local problems?**

A: We haven't heard about any general drop in water levels other than the usual shallow, hand dug wells that always seem to run low in late summer. There have been a few wells over the years that we had to lower the pumps in the existing well to gain a little more capacity. I believe that a few wells that had low flow problems probably due to the well being completed not deep enough into the aquifer. Some have been re-drilled deeper. Deepening an existing well is difficult and unlikely to succeed. A driller will generally move over a little and re-drill.