

A Winning Strategy

Follow these four objectives when addressing water quality concerns.

By Cliff Treyens

One of the highest purposes of the National Ground Water Association and its members is educating well owners on how to reduce risks to their water supplies. This is a year-round endeavor, but it is particularly relevant in light of ground water studies such as the U.S. Geological Survey's new report, *Quality of Ground Water from Private Domestic Wells*.

Educating well owners about reducing such risks to their water supplies is a public service upon which NGWA expends much of its time and dues dollars daily, and we've been at it for many years.

Accomplishing this mission, at its very core, rests with ground water professionals.

Educating the Professional

NGWA's mission statement says it all: "Dedicated to advancing the expertise of all ground water professionals." NGWA seeks to raise the bar of professionalism through professional education programs, certification, and publications—including *Water Well Journal*, Web sites, and networking opportunities with the best and brightest within the industry.

Quite simply, ground water professionals are on the front line of helping water well owners, and NGWA is training and supplying the troops. The battle plan for achieving a high quality of drinking water at the household level involves moving well owners toward four key objectives.

Step 1: Proper Well Location and Construction

Using a qualified water well system contractor in the construction of new wells is critical. "Qualified" means a professional who possesses the necessary credentials, skills, equipment, and knowledge. Locating a well away from potential or known contamination sources, and constructing the well according to applicable codes to minimize the potential for infiltration of contamination into the well, are vital to water quality.

To assist the well owner, NGWA's Wellowner.org Web site succinctly spells out basic considerations for choosing a qualified water well system contractor based on licensing, certification, liability and workers' compensation insurance, use of written contracts, and familiarity with health and safety codes. A checklist can be found at NGWA's www.wellowner.org under "Finding a Contractor."

Step 2: Regular Well System Maintenance

When it comes to existing wells, regular well maintenance is important to reducing risks to the water supply. This is no different than maintaining your furnace to make sure it's in good operating condition and safe. Member professionals can play a key role here by advocating yearly well maintenance inspections, as preventive maintenance is always the best strategy.

Wellowner.org's "Well Maintenance" section provides basic components of a well inspection, including compliance of well equipment to make sure it is sanitary and meets local code requirements.



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Step 3: Water Testing and Treatment

One of the most important responsibilities for well owners is testing their water quality. Common well owner questions include:

- How often should I test?
- What should I test for?
- How do I interpret results?
- What if there is a health concern?

Water well system contractors are uniquely qualified to answer these questions by promoting four key actions.

1. **Determine if the well is clean.** A dirty well, such as one with accumulated sediment or debris, can create an environment suitable to bacterial growth and impair effective disinfection. A qualified water well system contractor can determine if a well system needs cleaning.
2. **Test annually for bacteria, nitrates, and anything of local concern.** The water should be tested more frequently if there is:
 - Any change in the water's taste, odor, or appearance
 - A problem such as a broken well cap or a new contamination source
 - A family member or houseguest who has recurrent incidents of gastrointestinal illness
 - A pregnant woman or infant living in the home
 - A dangerous contaminant that shows up in a neighbor's water
 - A need to monitor the efficiency and performance of home water treatment equipment.

Contaminant sources of local concern include landfills, industrial sites, hazardous substance spills, or hazardous household substances.

Some naturally occurring contaminants—such as arsenic and radon—are area specific. NGWA advises its member contractors to inform their customers if certain naturally occurring contaminants may be present in the geographic area and to stress to the consumer the importance of testing prior to use. NGWA's standard form contract includes appropriate sections and addenda for these purposes.

Resources for You

- Best suggested practice documents on residential well cleaning and reducing problematic concentrations of arsenic, microorganisms in residential well systems, nitrates, and radon – www.ngwa.org
- Domestic Water Treatment – book available in NGWA Bookstore on www.ngwa.org
- "Ground Water and Wells: Reduce Risks to Your Water Supply" brochures for customers – packs available in NGWA Bookstore on www.ngwa.org
- "How to Keep Water Systems Safe" brochures for customers – packs available in NGWA Bookstore on www.ngwa.org
- Wellowner.org Web site with information for home owners who have well systems
- "What you need to know: Facts for Wellowners" – compilation of information sheets for customers available in NGWA Bookstore on www.ngwa.org

Local water treatment companies, health officials, or water testing laboratories also may be able to tell well owners about naturally occurring contaminants to be concerned about.

3. **Use a qualified water testing lab.** A qualified water well system contractor can direct well owners to appropriate water testing laboratories, as can local health departments or state agencies that oversee water well construction. State agencies can be found at www.ngwa.org/govaffairs/statereg.aspx.

If a qualified drinking water testing lab is not available locally or doesn't provide the tests needed, a national water testing lab, such as National Testing Laboratories (www.ntllabs.com) and Underwriters Laboratories (www.ul.com), may be able to help

The lab or water well system contractor can help a well owner determine whether test results indicate a health risk. A state or local health agency also may be able to help interpret water test results. One can also check results against the U.S. Environmental Protection Agency's maximum contaminant levels at www.epa.gov/safewater/contaminants/index.html#listmcl.

4. **If necessary, have an appropriate water treatment device installed.** Sometimes, contaminants above levels of health concern remain after proper well system maintenance. Ground water professionals can take the lead in guiding well owners to water treatment devices that address their specific concerns.

When considering a water treatment device, its specifications should match up to the substances and concentrations in the water. Also, there are performance testing programs for treatment systems, such as those of the Water Quality Association and NSF International. The contractor should evaluate if technology being provided to the customer has been voluntarily submitted for performance testing. Once installed, it is important that water treatment equipment be serviced according to the manufacturer's recommendations.

Table 1 highlights eight inorganic constituents in the new USGS study, *Quality of Ground Water from Private Domestic Wells*. These constituents were found at concentrations greater than certain guidelines in 1% or more of wells sampled. The table provides guidance on water treatment technologies that show promise in removing these substances from water.

Step 4: Ground Water Protection

Another important area of public awareness involves educating well owners on how they can avoid contaminating their water supplies. Contractors should inform them of at least three key areas:

- Location and decommissioning of abandoned wells (see "Well Maintenance" section of www.wellowner.org)
- Septic system maintenance (see "Well Basics" at www.wellowner.org)
- Proper use, storage, and disposal of hazardous household substances (see "Water Quality/Ground Water Protection" section of www.wellowner.org).

The tactics for achieving these four key objectives—proper well location and construction, regular well system maintenance, water testing and treatment, ground water protection—involve the second part of NGWA's mission statement: "To further ground water awareness through education and outreach."

By educating the ground water professional and the well owner, NGWA and its member professionals are advancing the cause of ground water quality.

Table 1. Treatment for Selected Contaminants				
Contaminant	Human Health Benchmark		Treatment	
	Safe Drinking Water Act MCL ¹	Non-SDWA Guidelines ²	Water Treatment Technologies	NSF International Listed ⁷
Arsenic	10 ug/L		Anion exchange; specialty resins/media; reverse osmosis ⁴	Distillation; filtration; reverse osmosis
Boron		1000 ug/L	Anion exchange; reverse osmosis (sensitive to pressure); distillation; electro dialysis ⁵	
Fluoride	4 mg/L		Activated alumina; reverse osmosis; distillation; electro dialysis ⁵	Distillation; reverse osmosis
Manganese		300 ug/L	Filtration (oxidizing filters); cation exchange ⁶ ; reverse osmosis ⁶ ; distillation; oxidation/precipitation filtration; pressure aeration/filtration; electro dialysis	
Nitrate	10 mg/L		Anion exchange; distillation; reverse osmosis ⁴	Distillation; filtration; reverse osmosis
Radon		4000 pCi/L 300 pCi/L <i>See footnote 3</i>	Activated carbon; aeration ⁴	Filtration. NSF also identifies aeration as a possible treatment option although they do not currently certify this equipment
Strontium		4000 g/L	Cation exchange water softening; reverse osmosis; distillation ⁵	
Uranium	30 ug/L		Coagulation/filtration; submicro/filtration; anion exchange; activated alumina; reverse osmosis; distillation; electro dialysis ⁵	Because of issues with handling uranium, NSF does not certify products in its testing lab for uranium removal

¹Safe Drinking Water Act regulates public water systems. Maximum contaminant levels (MCLs) are developed by U.S. EPA for public water systems. State or local agencies may develop more stringent requirements or use MCLs as guidelines or standards for household well systems.

² Guidelines as used here may be proposed MCLs, such as for radon, or health-based screening levels developed by U.S. Geological Survey.

³ U.S. EPA has proposed a two-level MCL for radon: a 4000 pCi/L if a multimedia mitigation program is in effect, or a 300 pCi/L if no mitigation program is in effect. See www.epa.gov/OGWDW/radon/proposal.html.

⁴ Treatment technology listed in Best Suggested Practices Series developed by National Ground Water Association

⁵ Treatment technologies identified by the Water Quality Association

⁶ Manganese must be maintained in the soluble manganous state to avoid fouling and interference with effective reverse osmosis membrane rejection, and also with the continued effectiveness of manganese removal by cation exchange.

⁷ Other testing labs, e.g., Water Quality Association and Underwriters Laboratory, also test product performance to NSF standards. Check their Web sites at www.wqa.org and www.ul.com for further information.