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FALL 2009

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Section 1.0 Introduction

Welcome to Woodstock Hardware's Water Supply, Treatment, and Filtration Technical Handbook.

This handbook provides a wealth of information about local town and private potable water supply systems and the products and systems available to improve the quality of your family's water. The water they use to drink, cook, clean, and bathe.

This technical handbook provides our valued customers:

1. A brief introduction into the world of potable, drinking water, and supply systems.
2. A summary of information, guidelines, and regulations that apply to potable drinking water supply systems.
3. An extensive list of common questions and valuable answers about potable water and potable water treatment and filtration systems.
4. A comprehensive glossary of terms and definitions that are encountered when learning about potable water and water treatment and filtration systems.

Following you will find ten simple questions concerning your homes water that you and your family drink and use to bath in on a daily basis. Take a moment to review and answer these questions.

1. Are you concerned about your family's health and well being?
2. Do you have city, town, or public water?
3. Do you have private, potable water well?
4. Have you had your homes water tested in the last year or two?
5. Do you have a water treatment system?
6. Do you have a water filtration system?
7. Do you know how your treatment or filtration systems work?
8. Do you know when the last time you refilled your water softener with solar salt?
9. Do you know what micron water filter you use in your home?
10. Do you know the date you last changed your ultra-violet disinfection bulb?

If you hesitated answering any of these questions, or were unsure of an answer to these questions then you will most likely find the information presented in this technical handbook very helpful.

Additionally if any of your answers showed that you could use some help learning more about your homes water supply, or your homes water treatment and filtration system, then you might find either or both of the following documents informative and helpful.

- **Woodstock Hardware's Water Treatment and Filtration System Maintenance Program.** www.woodstock-doitbest-hardware.com/waterforlifehome.html
- **Woodstock Hardware's Water Treatment and Filtration Supply Catalog.** www.woodstock-doitbest-hardware.com/watercatalogs.html

After reviewing the Technical Handbook if you would like any additional information regarding the water treatment and filtration products or services we offer please feel free to stop in the store or visit us at www.woodstock-doitbest-hardware.com.

We are happy to have made the effort to assemble all of this valuable information and hope you find it useful in better understanding where your water comes from and the methods available to improve the quality of the water you and your family use on a daily basis.

Section 2.0 Potable Water Supply and Treatment Information, Guidelines, and Regulations

There is a wealth of information available about potable drinking wells and water. As a service to our customers Woodstock Hardware has gathered some of the valuable information and created this handbook.

The following information provides only a snippet of the information available from both the U.S. EPA and the State Of New York. If you are interested in learning more about your potable water we encourage you to visit the websites of both authorities. The following information was taken from the U.S. Environmental Protection Agency's, Private Drinking Water Wells document.

If your family gets drinking water from a private well, do you know if your water is safe to drink? What health risks could you and your family face? Where can you go for help or advice? The information contained in this web site will help you answer these questions.

EPA regulates public water systems; it does not have the authority to regulate private drinking water wells. Approximately 15 percent of Americans rely on their own private drinking water supplies, and these supplies are not subject to EPA standards, although some state and local governments do set rules to protect users of these wells. Unlike public drinking water systems serving many people, they do not have experts regularly checking the water's source and its quality before it is sent to the tap. These households must take special precautions to ensure the protection and maintenance of their drinking water supplies.

Basic Information

There are three types of private drinking water wells: dug, driven, and drilled. This includes a dug well, a driven well, or a drilled well.

Proper well construction and continued maintenance are keys to the safety of your water supply. Your state water-well contractor licensing agency, local health department, or local water system professional can provide information on well construction.

The well should be located so rainwater flows away from it. Rainwater can pick up harmful bacteria and chemicals on the land's surface. If this water pools near your well, it can seep into it, potentially causing health problems.

Water-well drillers and pump-well installers are listed in your local phone directory. The contractor should be bonded and insured. Make certain your ground water contractor is registered or licensed in your state, if required.

If your state does not have a licensing/registration program contact the National Ground Water Association. They have a voluntary certification program for contractors. (In fact, some states use the Association's exams as their test for licensing.) For a list of certified contractors in your state contact the Association at (614) 898-7791 or (800) 551-7379. There is no cost for mailing or faxing the list to you.

To keep your well safe, you must be sure possible sources of contamination are not close by. Experts suggest the following distances as a minimum for protection — farther is better.

- Septic Tanks, 50 feet
- Livestock yards, Silos, Septic Leach Fields, 50 feet
- Petroleum Tanks, Liquid-Tight Manure Storage and Fertilizer Storage and Handling, 100 feet
- Manure Stacks, 250 feet

Many homeowners tend to forget the value of good maintenance until problems reach crisis levels. That can be expensive. It's better to maintain your well, find problems early, and correct them to protect your well's performance. Keep up-to-date records of well installation and repairs plus pumping and water tests. Such records can help spot changes and possible problems with your water system. If you have problems, ask a local expert to check your well construction and maintenance records. He or she can see if your system is okay or needs work.

Protect your own well area. Be careful about storage and disposal of household and lawn care chemicals and wastes. Good farmers and gardeners minimize the use of fertilizers and pesticides. Take steps to reduce erosion and prevent surface water runoff. Regularly check underground storage tanks that hold home heating oil, diesel, or gasoline. Make sure your well is protected from the wastes of livestock, pets, and wildlife.

What You Can Do

Private, individual wells are the responsibility of the homeowner. To help protect your well, here are some steps you can take:

Have your water tested periodically. It is recommended that water be tested every year for total coliform bacteria, nitrates, total dissolved solids, and pH levels. If you suspect other contaminants, test for those. Always use a state certified laboratory that conducts drinking water tests. Since these can be expensive, spend some time identifying potential problems.

Testing more than once a year may be warranted in special situations:

- Someone in your household is pregnant or nursing
- There are unexplained illnesses in the family
- Your neighbors find a dangerous contaminant in their water
- You note a change in water taste, odor, color or clarity
- There is a spill of chemicals or fuels into or near your well
- When you replace or repair any part of your well system

Identify potential problems as the first step to safeguarding your drinking water. The best way to start is to consult a local expert, someone that knows your area, such as the local health department, agricultural extension agent, a nearby public water system, or a geologist at a local university. (See more detailed information below)

Be aware of your surroundings. As you drive around your community, take note of new construction. Check the local newspaper for articles about new construction in your area.

Check the paper or call your local planning or zoning commission for announcements about hearings or zoning appeals on development or industrial projects that could possibly affect your water.

Attend these hearings, ask questions about how your water source is being protected, and don't be satisfied with general answers. Make statements like "If you build this landfill, (just an example) what will you do to ensure that my water will be protected." See how quickly they answer and provide specifics about what plans have been made to specifically address that issue.

Identify Potential Problem Sources

To start your search for potential problems, begin close to home. Do a survey around your well:

- Is there livestock nearby?
- Are pesticides being used on nearby agricultural crops or nurseries?
- Do you use lawn fertilizers near the well?
- Is your well "downstream" from your own or a neighbor's septic system?
- Is your well located near a road that is frequently salted or sprayed with de-icers during winter months?
- Do you or your neighbor's dispose of household wastes or used motor oil in the backyard, even in small amounts?

If any of these items apply, it may be best to have your water tested and talk to your local public health department or agricultural extension agent to find way to change some of the practices which can affect your private well.

In addition to the immediate area around your well, you should be aware of other possible sources of contamination that may already be part of your community or may be moving into your area. Attend any local planning or appeal hearings to find out more about the construction of facilities that may pollute your drinking water. Ask to see the environmental impact statement on the project. See if underground drinking water sources has been addressed. If not, ask why.

Common Sources of Potential Ground Water Contamination

Category	Contaminant Source
Agricultural	• Animal burial areas • Drainage fields/wells • Animal feedlots • Irrigation sites • Fertilizer storage/use • Manure spreading areas/pits, lagoons • Pesticide storage/use
Commercial	• Airports • Jewelry/metal plating • Auto repair shops

Category	Contaminant Source
	• Laundromats • Boatyards • Medical institutions • Car washes • Paint shops • Construction areas • Photography establishments • Cemeteries Process waste water drainage • Dry cleaners fields/wells • Gas stations • Railroad tracks and yards • Golf courses • Research laboratories • Scrap and junkyards • Storage tanks
Industrial	• Asphalt plants • Petroleum production/storage • Chemical manufacture/storage • Pipelines • Electronic manufacture • Process waste water drainage Electroplaters fields/wells • Foundries/metal fabricators • Septage lagoons and sludge • Machine/metalworking shops • Storage tanks • Mining and mine drainage • Toxic and hazardous spills • Wood preserving facilities
Residential	• Fuel Oil • Septic systems, cesspools • Furniture stripping/refinishing • Sewer lines • Household hazardous products • Swimming pools (chemicals) • Household lawns
Other	• Hazardous waste landfills • Recycling/reduction facilities • Municipal incinerators • Road deicing operations • Municipal landfills • Road maintenance depots • Municipal sewer lines

Category	Contaminant Source
	• Storm water drains/basins/wells • Open burning sites • Transfer stations

The following information taken from NYS Department of Health, Individual Water Supply Wells - Fact Sheet #3

Water quality testing is important for new drinking water wells in addition to periodic evaluation of existing wells. The table below lists the recommended testing parameters for new individual residential water supply wells. These tests should be performed following proper well installation and development, and prior to homeowner use. Beyond these initial tests it is recommended to test for coliform bacteria every year and to periodically re-test water quality for other well-specific constituents of concern.

All samples should be analyzed by a laboratory certified by the NYSDOH Environmental Laboratory Approval Program (ELAP) for testing potable water. A current listing of ELAP laboratories may be found by contacting your Local Health Department (LHD).

Analysis *	Recommended MCL[1][2]	Concerns
Coliform Bacteria	Any positive result is unsatisfactory	Indicator of possible disease causing contamination, e.g. Gastro-intestinal illness
Lead	0.015 mg/l	Brain, nerve and kidney damage (especially in children)
Nitrate	10 mg/l as N	Methemoglobinemia ("blue baby syndrome")
Nitrite	1 mg/l as N	Methemoglobinemia ("blue baby syndrome")
Iron	0.3 mg/l	Rust-colored staining of fixtures or clothes
Manganese	0.3 mg/l	Black staining of fixtures or clothes
Iron plus manganese	0.5 mg/l	Rusty or black staining of fixtures or clothes
Sodium	No designated limit[3]	Effects on individuals with high blood pressure
pH	No designated limit	Pipe corrosion (lead and copper), metallic-bitter taste
Hardness	No designated limit	Mineral and soap deposits, detergents are less effective
Alkalinity	No designated limit	Inhibits chlorine effectiveness, metallic-bitter taste
Turbidity	5 NTU	Cloudy, "piggybacking" of contaminants, interferes with chlorine and UV-light disinfection

1. MCL means maximum contaminant level. The MCLs listed are based upon requirements for Public Water Supply systems and are also recommended for use on individual residential systems.
2. mg/l means milligram per liter (parts per million); NTU means Nephelometric Turbidity Units.
3. Water containing more than 20 mg/l of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/l of sodium should not be used by people on moderately restricted sodium diets.

Additional tests are recommended for naturally occurring constituents that appear on a regional basis such as: arsenic, barium, fluoride, methane, radium, radon, and uranium. Additional tests may also be appropriate for contaminants associated with potential sources such as: oil storage facilities, junkyards, gasoline stations, landfills, industry, and active or historic agricultural use. Water samples from older existing residences or residences with corrosive water (i.e., pH less than 6.5) should be tested for lead and copper.

Some LHD's may have their own residential water quality testing requirements. Contact the LHD to determine their required analyses and procedures, and to inquire about any local water quality concerns.

The table below, **Reasons to test your Water,** is based upon the United States Environmental Protection Agency's (USEPA) publication: "Drinking Water From Household Wells", January 2002.

This table may also be used as a reference for determining additional testing.

Conditions or Nearby Activities:	Test for:
Recurring gastro-intestinal illness[1]	Coliform bacteria, e-coli
Household plumbing contains lead (older homes)	pH, lead, copper
Radon in indoor air or region is radon rich	Radon
Corrosion of pipes, plumbing	pH, lead, copper
Nearby areas of intensive agriculture	Nitrate, pesticides, arsenic, coliform bacteria
Coal or other mining operations nearby	Metals, pH
Gas drilling operations nearby	Sodium, chloride, barium, strontium
Dump, junkyard, landfill, factory, gas station, or dry-cleaning operation nearby	Volatile organic compounds, total dissolved solids, pH, sulfate, chloride, metals
Odor of gasoline or fuel oil, and near gas station or buried fuel tanks	Volatile organic compounds
Objectionable taste or smell	Hydrogen sulfide, pH, metals
Stained plumbing fixtures, toilet tanks or laundry	Iron, copper, manganese, hardness
Salty taste and seawater, or a heavily salted	Sodium, chloride, total dissolved solids

Conditions or Nearby Activities:	Test for:
Recurring gastro-intestinal illness[1]	Coliform bacteria, e-coli
roadway nearby	
Scaly residues, soaps don't lather	Hardness
Rapid wear of water treatment equipment	pH
Water softener needed to treat hardness	Hardness, manganese, iron
Water appears cloudy, frothy, or colored	Color, detergents, turbidity, total dissolved solids
Reddish-brown films on fixtures or toilet tanks	Iron bacteria, iron, manganese

If you are interested in, or need further information, regarding a private well or potable drinking water we suggest you visit one or all of the following sites.

http://www.epa.gov/safewater/privatewells/index2.html

National Ground Water Association's Wellowner.org

http://www.health.state.ny.us/environmental/water/drinking/part5/append5b/fs3_water quality.htm

http://www.co.ulster.ny.us/resources/health.Environmental

Section 3.0 Commonly Asked Questions With Valuable Answers Regarding Potable Water Supply, Filtration, and Treatment Systems

Following you will find many of the questions asked and the answers that relate to your potable water supply system and the treatment and filtration of your homes potable water.

What should I do if I have my own drinking water well?

If you have your own well, you are responsible for making sure your water is safe for you and your family to use. Private wells should be tested annually for nitrate and coliform bacteria to detect contamination problems early. You should test more frequently and for other contaminants, such as radon or pesticides, if you suspect there is a problem with your water.

Be aware of activities in your watershed that may affect the water quality of your well, especially if you live in an un-sewered area. Check with your local health department and local public water systems that use ground water to learn more about well water quality in your area and what contaminants you are most likely to find.

More information is available on EPA's private drinking water wells Web site. You can help protect your water supply by carefully managing activities near the water source, to find out how visit EPA's Source Water Protection Web site.

How do you know if there are contaminants in your public water system?

All public water systems contain some level of one or more unhealthful chemicals. Regulations only require periodic testing of about 86 chemicals. There are now more than 75,000 chemicals used in our society with over 1000 new ones being developed each year. Contaminant levels fluctuate throughout the year making it impossible to know the actual level of contamination in a central water system. So far over 2100 toxic chemicals have been detected in America's water systems. The risk is high and the cost for a sure solution is low.

What are some reasons to test your water?

The chart below will help you spot problems with your drinking water. The last five problems listed are not an immediate health concern, but they can make your water taste bad, may indicate problems, and could affect your water supply over the long term.

Conditions or Nearby Activities:	Test for:
Recurring gastro-intestinal illness	Coliform bacteria
Household plumbing contains lead	pH, lead, copper
Radon in indoor air or region is radon rich	Radon
Corrosion of pipes, plumbing	Corrosion, pH, lead
Nearby areas of intensive agriculture	Nitrate, pesticides, coliform bacteria
Coal or other mining operations nearby	Metals, pH, corrosion
Gas drilling operations nearby	Chloride, sodium, barium, strontium
Dump, junkyard, landfill, factory, gas station, or dry-cleaning operation nearby	Volatile organic compounds, total dissolved solids, pH, sulfate, chloride, metals
Odor of gasoline or fuel oil, and near gas station or buried fuel tanks	Volatile organic compounds
Objectionable taste or smell	Hydrogen sulfide, corrosion, metals
Stained plumbing fixtures, laundry	Iron, copper, manganese
Salty taste and seawater, or a heavily salted roadway nearby	Chloride, total dissolved solids, sodium
Scaly residues, soaps don't lather	Hardness
Rapid wear of water treatment equipment	pH, corrosion
Water softener needed to treat hardness	Manganese, iron
Water appears cloudy, frothy, or colored	Color, detergents

What kind of water filter do I need?

Water filters are design to target specific contaminants. You must choose a system according to the contaminants that you are concern with. Sometimes these contaminants are easy to detect and sometimes they are not.

Common problems found in public or town water: taste and odor, chlorine, turbidity or hardness. Common problems with well water: taste and odor, chlorine, turbidity, hardness, iron stains, rotten smell odor (sulfur), green/blue stains (Low Ph), etc

If you have public or town water, you can request a water quality analysis report at your local water department. This report should provide important aspects to be considered when choosing a water filter like hardness, chlorine level, and turbidity.

If you have well water it is recommended that you test your water for contaminants. You can use any in home water test kit or you can have a professional company test the water for you. In both cases, whether you have town or well water, the safest thing to do is test your water to see what contaminants are present and what needs to be removed.

What size water filter do I need?

Once you know what type of filter you need, you must also figure out the size of the filter you need.

First, determine the application of the filter. For example, you may be using the filter for drinking water that will not require more than a 2 gpm (gallons per minute) flow rate. On the other hand, you may need a flow rate of over 20 gpm if you are using the filter as a whole house filter.

Next, determine the preferred pressure drop for your application. Although it varies for each application, it is generally advised that consumers keep the pressure drop on a new cartridge below 2 or 3 psi (pounds per square inch). This is sometimes referred to as the clean pressure drop.

Finally, you need to select the filter size that allows for your desired flow rate while maintaining the necessary clean pressure drop. When in doubt, get a bigger water filter cartridge. If you get a filter that is too small, it will break down too quickly and will not be effective. Longer filters last longer than shorter filters. 20 inch water filters should be able to run at twice the flow rate for the same pressure drop as a 10 inch water filter with the same filtration technology.

Why should I have a whole house water filter?

There are many reasons to have a whole house water filter, but one of the most important is that we don't just interact with the contaminants in the water by drinking it but through other activities such as; direct contact while bathing, cooking our foods, making our ice and home made beverages, even when we are using water for our daily tasks we are exposure to any contaminates while breathing.

I already have a whole house water filter. Is it safe to drink the water?

Whole house water filters comes in different style and have different purpose. They all offer different levels of safety when it comes to drinking water. If possible you need to be able to block contaminants as smaller as bacteria and pesticides. If you own a whole house ultraviolet filtration system, you are probably getting down to the smallest level of blocking.

The ultraviolet systems are capable rearranging DNA molecules and preventing the cells from reproducing. The cells are then considered dead for all practical purposes. Other whole house systems like softeners and carbon filter do not offer this level of protection when it comes to drinking water unless they are accompanied with ultraviolet drinking water systems, reverse osmosis systems or water distillers.

How can I eliminate hard water?

To eliminate hard water, you will need a water softener system, often called a water conditioner system.

How can I eliminate sediments from my water?

You can use a sediment filter to eliminate sediments (turbidity) from your water. Sediment filter are usually used as the first stage of drinking water filters. You can also use a multimedia whole house backwash filter to eliminate turbidity for the whole house. The multimedia filters are usually install in private well water applications.

How can I eliminate chlorine from my water?

Chlorine can be eliminated by using Carbon Filter Media. There are several filter systems in our website that include carbon media filtration for the elimination of chlorine. Some of them are: under sink dual and triple drinking water systems, reverse osmosis systems, counter top systems, whole house carbon filter, three stage whole house ultraviolet filtration systems, shower and bath filters.

How can I eliminate sediments from my water?

You can use a sediment filter to eliminate sediments (turbidity) from the water. Sediment filter are usually used as the first stage of drinking water filters. You can also use a Multimedia Whole House Backwash filter to eliminate turbidity for the whole house. The multimedia filters are usually install in well water applications.

How can I eliminate iron stains from my well water?

Iron can be found in four different forms:

Ferrous Iron: It is often called "clear iron" and the iron particles are no visible in the water. The iron particle will rust once they interact with air. This form of iron can not be mechanical filtered from the water. It can be treated by ion exchange using a water softener or water conditioner or a Manganese Greensand Iron Filter. Certain water conditions need to exist. See product specification for details.

Ferric Iron: It is often called "red water iron" and the iron particles are visible in the water. The iron particles in this case rust when they are in contact with the water forming solid particles and therefore, they can be mechanical filtered. This form of iron can be treated with a Manganese Greensand Iron Filter or with a Backwash Birm Media Filter.

Bacterial Iron: It is often called "pink water iron" and it may not be visible in the water. However, you may see a reddish/green slime build up where water is kept for period of time like toilets and bathtub. As it name indicates, this form of iron are iron particles that have or have had life. This form of iron may need to be treated with chlorine before Manganese Greensand Iron Filter or a Media Backwash Filter is installed.

Colloidal Iron: Very small oxidized (colloidal size) iron particles that are suspended in the water that when combined with organic matter cause them to repel each other. This form of iron is visible in the water and it looks similar to the ferric Iron.

Because the iron particles are very small and in suspension this form of iron can not be filtered mechanically. The water needs to be treated with chlorine first so the organic matter bound with the iron particles are eliminated and the iron particles left can flocculate together in order for conventional filtration to be applied.

I don't have any iron stains in my house, but I tested the water and it seems to have iron. What can I do?

It is possible that you may have Ferrous Iron often called "clear iron" and the iron particles are no visible in the water. The iron particle will rust once they interact with air. This form of iron cannot be mechanically filtered from the water. The water can be treated by ion exchange using a water softener or water conditioner or a manganese greensand iron filter.

My well water smells like a rotten egg. Can I do something to resolve this issue?

Rotten egg odor is cause by the presence of hydrogen sulfide (sulfur) in the water. The hydrogen sulfide can be treated with a chlorinator system or a manganese greensand filter.

How can I eliminate bacteria from my water?

There are several process that effectively removed or neutralize Bacteria and others microorganism. The micro filtration is process of removing particles from 0.1 to 0.0002 micron in size and is extremely effective removing bacteria, fungal spores, yeast and some viruses since they fall into this size range, the reverse osmosis process belongs to this category. The ultraviolet disinfections is also effective in neutralizing microorganism. Microbes are destroyed when UV light penetrates the cell wall and cytoplasm membrane and is absorbed by the nucleic acids. The UV energy rearranges DNA molecules and prevent the cells from reproducing. It's then considered dead for all practical purposes. The degree of destruction of microbes is a product of UV intensity multiplied by contact time. The lower end of macro filtration filters that have 0.5 micron filtration capabilities are also effective removing micro organisms including e-coli bacteria and cyst reduction like Giardia, Crystospordium and Coliform bacteria which falls into this size range.

I have green and/or blue stains. How can I prevent this from happening?

Green and/or blue stains are often seen in low Ph water (acidic water). These stains can be prevented by raising the water Ph to its neutral level (7). The neutralizer systems with calcite, corosex or a combination or the two filter media can be used to raise the Ph. The solution depends in the Ph level and the system performance your are looking for.

How can I eliminate lead from my water?

Lead can be eliminated with micro filtration like reverse osmosis or with drinking water filters that specifically mention lead removal in the specifications.

I can't find the replacement water filter that I'm looking for. Are the replacement filters in the store the only filters you carry?

If you don't find the replacement filter that you are looking for, we ask that you contact us with a detail description of your water filter. Even if we don't currently carry your water filter we may be able to get your special filter from one of our suppliers.

I don't have enough pressure in my well water. Is there anything I could do to own a reverse osmosis system?

There are reverse osmosis and ultraviolet disinfections systems that comes with a booster pump for low water pressure applications.

What are VOC's?

Volatile Organic Chemicals are synthetic compounds that turn into vapor at relatively low temperatures. VOC's typically vaporize at a much lower temperature than water. Most synthetic chemicals found in water, such as pesticides and herbicides, are VOC's.

What is TDS?

Total Dissolved Solids, TDS, is the total measurement by weight of all solids that are dissolved in water. The dissolved solids in water are primarily calcium and magnesium and would not be a measurement of contamination. Tests which measure the conductivity of water (often used by companies selling reverse osmosis systems) only give a rough estimate of dissolved solids and should not be viewed as an indicator of water quality.

Why do the filtration systems not reduce Total Dissolved Solids - TDS?

'Filtration' systems are designed to selectively remove contaminants and to leave in the dissolved trace minerals such as calcium and magnesium. These water-borne minerals are healthful and give water a more natural flavor. Systems that remove minerals lower the pH of water and cause it to be more aggressive. Low pH water will seek to balance itself by leaching elements such as copper, lead or aluminum from plumbing fixtures and cooking utensils. Cooking in mineralized water will also draw the minerals from your foods causing a reduced nutritional value.

Water with a balanced mineral content has a much less tendency to take on foreign elements. TDS (total dissolved solids) is primarily made up of dissolved minerals and is not related to harmful contaminants. It is very deceptive for companies to imply that a reduction in TDS means improved water quality, in most cases it does not.

Why would the filtered water from the unit appear cloudy sometimes?

Occasionally, filtered water may appear milky or cloudy. The siphon action in closing the faucet can create air pockets in the filter. These air pockets will produce tiny air bubbles in the filtered water which cause the appearance of cloudiness. This air will disappear if the glass of water sits for a minute. If cloudiness is noticed in the filtered water, turn the filter upside down and allow water to run for two to three minutes. This will allow the air pockets to purge out of the filter cartridges.

Can water filters be used on hot water?

It is not recommended to use drinking water filters on hot water due to the potential for leakage. The soft rubber tubing on most Counter-Top systems and the o-ring seals can soften and create leaks when exposed to hot water. Most countertop systems are rated for water temperatures up to 90 degrees. Shower filters can be used with water up to 115 degrees, 100 to 104 is normal shower temperature.

Do people on private wells need to use shower filters?

There are many health and cosmetic benefits to removing chemicals and compounds from shower water, even on non-chlorinated private wells. Virtually all ground water contains traces of some chemical or chemicals that can be absorbed through the skin or inhaled. Also shower filters helps balance the waters pH, which is also a cosmetic benefit.

How does a water softener differ from filtration products?

Water softeners are not designed to improve the healthfulness of water, but rather to decrease dissolved minerals and reduce scaling of pipes and appliances. These systems typically use a sodium charged exchange media that releases sodium ions and removes minerals such as calcium, magnesium, or potassium. From a health standpoint, the minerals would be preferred over the sodium. Filtration systems are designed to specifically remove harmful contaminants and leave in the natural minerals.

Are filtration products considered purifiers?

Technically, a purifier would be a system that provides 'pure' water-hydrogen and oxygen with no other components.Pure water of this sort does not exist except in the controlled environment of a laboratory. Most references to 'pure water' are in relation to the bacteria content and not the chemical contaminant concentrations. The EPA defines 'pure' as water free from all types of bacteria and viruses.
Each of these definitions would describe
e a system significantly different from a drinking water filter. Many filtration systems are designed to eliminate chlorine resistant parasites like cryptosporidium and giardia but should not be sold as a means of treating water of unsafe bacteriological quality.

Are water products EPA approved?

No, the EPA does not approve anyone's product. Only products which contain regulated contaminants, like silver in silver impregnated carbon filters, are required to have an EPA 'registration' number. An EPA registration number simply means that the product contains something that the EPA has determined to be harmful.

Do water treatment products require FDA approval?

No, however the certifications which apply certified products require proof that all component materials meet FDA requirements for food grade materials. The performance claims of a filtration system should be validated and certified by the California Department of Health Services to ensure compliance.

How do filters compare to reverse osmosis or distillation systems?

Reverse osmosis and distillation are non-selective de-mineralizing processes. The water produced by these systems has been stripped of all mineral content which causes water to be acidic and aggressive. The healthiest water is water that is free from contamination but still contains a natural mineral balance. Filtration systems are designed to selectively remove contaminants and allow the natural minerals to pass through.

Are whole house systems (P.O.E. - point-of-entry) better than counter-top filters (P.O.U. - point-of-use)?

P.O.U. systems are by far the best way to ensure the highest quality water since many water-borne contaminants come from the plumbing in your house, especially lead and vinyl chloride from the piping. By filtering water at the point-of-use you remove contaminants just prior to consumption, eliminating the chance of recontamination. Point-of-entry systems are very beneficial in that they provide filtered water to all baths and showers as well as other water appliances. By filtering all the water going into your home you improve not only the healthfulness of the water, but you greatly improve the indoor air quality by removing chlorine and other chemicals that vaporize and get into the indoor air.

What are some good web sites to find documentation on water problems?

NRDC.org (Natural Resources Defense Council), EWG.org (Environmental Working Group), EDF.org (Environmental Defense Fund), and CDC.gov (Center for Disease Control) are all good informational sites with numerous documented studies on water problems.

Do filter systems remove Radon?

Radon is a gas produced by decaying Uranium and is more often a problem when airborne, however some areas may have Radon in the water which can be effectively removed by most carbon filters.

Aren't water treatment plants supposed to remove harmful substances from my water supply?

Water treatment plants are not always effective at removing harmful substances from your water supply. To ensure the protection of you, your family, and your children, it is recommended that you get a Reverse Osmosis System to reduce more contaminants in your drinking water. However, if you cannot afford a Reverse Osmosis System, look into Under Sink Water Filters to improve drinking water safety. Also, Whole House Water Filters filter the water coming into your house which can increase the life of your appliances having cleaner water

If my municipal water company's Annual Water Quality Report shows that it meets all EPA guidelines, does that mean it's safe?

On October 1st 1999 a new federal law went into effect that requires water utilities to send each customer a detailed report showing what is in their water, appropriately called 'The Right To Know Amendment'. The most important thing to remember is that no matter how insistent these reports are that 'contaminants in your water do not necessarily pose a health risk ', any level of contamination in our drinking water does in fact represent a danger to our health. Of the over 75,000 toxic chemicals used in our society, the EPA has only set standards (MCLs) for 86, and those 86 Maximum Contaminant Levels are not necessarily set on "health effects."

The EPA considers limited health studies based on consumption of one certain chemical by a 175 lb. adult when setting these standards.No consideration is given to the effects on small children or the combined effects of two or more contaminants, which some studies show are magnified by as much as 1000 times. Water utilities are only required to test for the 86 contaminants that the EPA has set standards for. Nobody knows how many toxic chemicals may actually be in tap water.

According to the Ralph Nader Research Group, after reviewing thousands of pages of EPA documents acquired through the Freedom of Information Act, more than 2100 toxic chemicals have already been detected in U.S. water supplies. Virtually all public water systems have some level of contamination. The water utilities are usually quick to point out that the chemicals found in their water are 'below EPA's Maximum Levels', and in most cases they are.

The fact is that even the smallest trace of a toxic chemical causes damage and science is just now starting to realize to what extent. In a recent report from the National Cancer Institute to the Surgeon General it was stated that "No level of exposure to a chemical carcinogen should be considered toxicologically insignificant to humans," and we are learning the hard way the truth of this statement.

Section 4.0 Definition of Potable Water Supply, Treatment, and Filtration Terms

Following please find an alphabetical list of terms and definitions pertaining to your homes potable water supply system and potable water treatment and filtration systems.

Acidic – descriptive term used in reference to water having a pH of less than 7; pertains to the corrosiveness of water.

Acute Health Effects (acute toxicity) – Any poisonous effect with a sudden and/or severe onset produced within a short period of time after using contaminated water, resulting in mild to severe biological harm or illness. Acute symptoms include, but are not limited to, upset stomach, loose stool, bowel upset, and gastrointestinal difficulties. If symptoms occur as a result of drinking contaminated water, medical attention should be sought promptly.

Aesthetic Characteristics – The non health-related characteristics of water that make it desirable for human use. Generally taste, color, odor, and turbidity are considered to be aesthetic characteristics.

Alkaline – A water sample having a pH greater than 7 is alkaline (non-acidic).

Aquifer – An underground formation or group of formations in rocks and soils containing enough ground water to supply wells and springs.

Backflow – A reverse flow in water pipes. A difference in water pressures pulls water from sources other than the well into a home's water system, for example waste water or flood water. Also called back siphon.

Bacteria – Microscopic living organisms; some are helpful and some are harmful. "Good" bacteria aid in pollution control by consuming and breaking down organic matter and other pollutants in septic systems, sewage, oil spills, and soils. However, "bad" bacteria in soil, water, or air can cause human, animal, and plant health problems.

Certified Testing Laboratory – A lab listed by the Colorado Department of Public Health & Environment as qualified to test drinking water. Information about local state-approved labs is available at the Health Department.

Chronic Health Effects – Chronic means long-term. Chronic health effects occur and persist as a result of repeated or long term use of contaminated water. Often, it takes many years of exposure for chronic health effects to occur. Chronic health effects include irreversible damage

to internal organs, and changes to our gene structure, which can result in cancer, birth defects, disabilities, and other problems.

Coliform Bacteria – A type of bacteria that is found in the intestinal tract of all animals, including humans. These bacteria are used as an indicator of well cleanliness. If the coliform test is unacceptable, it is an indicator that your well is polluted and that additional tests or treatments are advisable. If the disinfection of your well does not remove the coliform bacteria seek the assistance of your local Health Department. Unacceptable coliform tests are usually seen on your report as: TNTC (too numerous to count) and confluent growth.

Concentration – The amount of a given substance (weight) in a specific amount of water (volume) and is expressed as mg/L or ppm.

Confining Layer – Layer of rock that keeps the ground water in the aquifer below it under pressure. This pressure creates springs and helps supply water to wells.

Contaminants – Naturally occurring substances when present in high enough levels make water unfit for drinking and/or other household uses.

Corrosive Water – Water that is acidic and "soft" may be corrosive and may deteriorate plumbing and leach toxic metals such as lead and copper from pipes.

Corrosivity Index – One of the methods for assessing the scale dissolving (corrosive) or scale forming potential of water. A positive number indicates a tendency to deposit calcium carbonate. If the result is negative, it is an indication that the water will dissolve calcium carbonate and enhance corrosion.

Cross-connection – Any actual or potential connection between a drinking (potable) water supply and a source of contamination.

Detection Limit – The minimum concentration of a substance that may be measured and reported in the given testing method. Many lab reports will state what the detection limit is for each contaminant.

Disinfection – The destruction of all pathogenic organisms, with chlorine, ozone, ultraviolet “UV” light or heating.

EPA – The abbreviation for the Environmental Protection Agency, properly called, "the United States Environmental Protection Agency." This agency has the responsibility of developing and enforcing Primary Drinking Water Standards. The EPA also develops, but does not enforce, Secondary Drinking Water Standards.

Grains per Gallon (gpg) – Apothecaries' weight of a chemical substance in one gallon of water used in the water-conditioning trade to indicate hardness of water. One gpg equals approximately 17 mg/L hardness.

Hardness – A water quality problem. Hardness is a relative term. It describes the content of the dissolved minerals, calcium and magnesium, and is reported as grains per gallon. Water with less than 3.5 grains per gallon is considered "soft"; while hard water above 7 grains per gallon may affect the appearance of plumbing fixtures, the lifespan of water heaters, and the effectiveness of detergents.

Health Risk – The risk or likelihood that a chemical will adversely affect a person's health. Estimating health risks is a complex and inexact science.

Heavy Metals – Elements with higher molecular weights, which are generally toxic in low concentrations to plant and animal life. Examples include mercury, chromium, cadmium, arsenic, selenium, and lead.

Hydrogen Sulfide – A hazardous, poison gas that smells like rotten eggs when it escapes from the water. It is sometimes produced by bacteria in well water. It can be found in local water wells at concentrations that are a nuisance but are not poisonous.

Iron Bacteria – Microorganisms that feed on iron in the water. They may appear as a slimy rust colored coating on the interior surface of a toilet flush tank or as a glob of gelatinous material in the water.

Leaching Field – The entire area where many materials (including contaminants) dissolve in rain, snowmelt, or irrigation water and are filtered through the soil.

Maximum Contaminant Level (MCL) – The maximum level of a contaminant permitted in public water supplies. Maximum contaminant levels are specified in the Primary Drinking Water Standards set by EPA for contaminants that affect the safety of public drinking water.

Microorganisms – Also called microbes. Very tiny life forms such as bacteria, algae, diatoms, parasites, plankton, and fungi. Some can cause disease.

Milligrams per Liter (mg/L) – Metric weight of a substance in a liter of water. 1 mg/ L = 1 ounce per 7,500 gallons. (1 mg/L = approximately 1 ppm in water).

Nitrate – A salt form of the chemical, nitrogen. The presence of nitrates in a water supply generally indicates pollution by human or animal waste, and/or commercial fertilizer.

Nuisance Contaminants – Contaminants that affect aesthetic or functional aspects of water quality and have little or no impact on health. They are managed by setting Secondary Maximum Contaminant Level Standards.

Organic Chemicals – Those chemicals that contain carbon. Today, many organic chemicals may pollute water supplies. These can include trihalomethanes, pesticides, and volatile organic chemicals such as gasoline.

Parts per Million (ppm) – Concentration of a substance on a weight basis in water. 1 ppm = 1 pound of a contaminant per million pounds of water (1 ppm in water = approximately 1 mg/L).

Pathogens – Live organisms that contaminate water such as bacteria, viruses, and parasites.

pH – A factor used to measure the acidity and alkalinity of water. Values for pH fall on a scale ranging from O to 14. Water that has a pH of 7 is neutral; water that is acid has a pH lower than 7 and water that is alkaline has a pH greater than 7. The secondary standard for drinking water is a pH between 6.5 and 8.5.

Pollutants – Man-made substances introduced to the environment that at high enough levels can make water unfit for human consumption or use.

Potable Water – Water fit for drinking.

Primary Drinking Water Standards – The Primary Drinking Water Standards are published, monitored, and enforced by the EPA. Primary standards regulate contaminants which pose serious health risks to the water user. The primary standards are only enforceable in public water systems and should be used as a guide for your personal drinking water well.

Private Water Systems – Any systems which do not meet the definition of public water systems, for example, a private individual water source, such as a residential water well. Private water systems are not regulated by the Colorado Department of Public Health & Environment or EPA.

Protozoa – One-celled animals, usually microscopic, that are larger and more complex than bacteria. May cause disease.

Public Water System – In Colorado, a public water system is one that serves at least 15 connections (for example households) or at least 25 individuals. Colorado Department of Public Health &Environment and EPA regulations apply to public water systems.

Pure – Without contaminants or pollutants.

Radionuclides – Distinct radioactive particles coming from both natural sources and human activities. Can be very long lasting as soil or water pollutants.

Radon – A tasteless, odorless, colorless radioactive gas formed from decay of uranium in rocks that has been found dissolved in some groundwater supplies. Activities that release radon as vapor from water include showering, bathing, and cooking. High concentrations of radon are known to be carcinogenic and are linked with increased risk of lung and other cancers.

Recharge Area – The land area through or over which rainwater and other surface water soaks through the earth to replenish an aquifer, lake, stream, river, or marsh. Also called a watershed.

Safe – The level of a contaminant or pollutant is low enough that no health problems will occur.

Saturated Zone – The underground area below the water table where all open spaces are filled with water. A well placed in this zone will be able to pump ground water.

Scale – Mineral deposits which build up on the inside of water pipes and water-using appliances, like coffee pots. It is primarily made of calcium carbonate and usually associated with hard water.

Secondary Drinking Water Standards – The Secondary Drinking Water Standards are published by the EPA. Secondary Standards set desirable/ acceptable levels for nuisance contaminants, which affect taste, odor, color, and other aesthetic and functional qualities of the water supply. These secondary standards are not enforced by law, but rather are guidelines for municipal water treatment plants and state governments.

Total Dissolved Solids (TDS) – A good general indicator of water quality, which measures the total amount of dissolved minerals, metals, and salts. Water with more than 500 milligrams per liter TDS is of marginal quality and may contain undesirable amounts of calcium, magnesium, sulfates, chlorides, or other salts.

Toxic Metals – Arsenic, Barium, Chromium, Mercury, Selenium, Lead, and other toxic metals are regulated by EPA Primary Drinking Water Standards. Toxic metals may be naturally occurring in rock and soil, or may pollute water as a result of runoff or leaching from industrial or agricultural sites or hazardous waste disposal.

Toxicity – The toxicity (poisonous effect) of a water contaminant depends on the concentration of the contaminant in the water and the period of time the contaminated water is consumed. Any chemical can be toxic, if you swallow enough of it. Also, people react differently to

different toxic substances; some people may be harmed more than others. Pregnant and nursing women, the elderly, infants, ill or malnourished people, and people taking medication may be especially vulnerable to certain contaminants.

Turbidity – A cloudy condition in water due to suspended silt or organic matter.

Unsaturated Zone – The area above the ground water level or water table where soil pores are not fully saturated, although some water may be present.

Viruses – Submicroscopic disease-causing organisms that grow only inside living cells.

Volatile Organic Chemicals (VOCs) – Synthetic compounds which evaporate readily and are difficult and expensive to detect. Primary Drinking Water Standards set limits for several volatile organic chemicals, including the solvents such as trichloroethylene and carbon tetrachloride, and the gasoline component, benzene. Tests for synthetic organic chemicals are not routine and tend to be fairly expensive because of the difficult and precise laboratory work involved.

Watershed – The land area that catches rain or snow and drains it into a local water body (such as a river, stream, lake, marsh, or aquifer) and affects its flow, and the local water level. Also called the recharge area.

Water Quality – Determined by these characteristics: safety, taste, color, smell, corrosiveness, staining, and hardness.

Water Table – The upper level of the saturated zone. This level varies greatly in different parts of the country and also varies seasonally depending on the amount of rain and snowmelt.

Well Cap – A tight-fitting, vermin-proof seal designed to prevent contaminants from flowing down inside of the well casing.

Well Casing – The tubular lining of a well. Also a steel or plastic pipe installed during construction to prevent collapse of the well hole.

Wellhead – The top of a structure built over a well. Term also used for the source of a well or stream.

Text for Water Quality Standards and Interpretation, and Water Testing Glossary are freely adapted from publications provided by the US Environmental Protection Agency, Pennsylvania Cooperative Extension, Oregon Cooperative Extension, Virginia Cooperative Extension and the Colorado Department of Public Health & Environment.