WATER: THE DIFFERENCE BETWEEN LIFE AND NO LIFE

To say that water is essential to life seems a monumental understatement. The fact is that life, at least as we know it, would not exist on planet Earth if it were not for water. Water is such a fundamental component of life that astronomers and planetary researchers base the probability of life existing on other planets almost solely on whether or not water is, or has ever been, present.

WATER: A BIG PORTION OF THE SMALLEST THINGS

The single cell is the basic structure from which all life is built. The smallest life forms are, indeed, simply one cell. The more complex the life form, the greater the number and diversity of the cells involved. In a human being there are 73 trillion cells and water is a component of every single one of them. In fact, the average healthy human is about 70% water.

WATER: A VITAL NON-NUTRIENT

Water is not classified as a nutrient since it does not provide protein, fats or carbohydrates. It is neither a vitamin nor a mineral, nor is it related to any similar nutrient. However, next to oxygen, water is the most vital element to continued life. Without oxygen a person can die in a matter of minutes, while a total lack of water requires about seven days to cause death. These elements are far more critical to life than food. Death from starvation (the lack of food) usually occurs only after weeks have passed. Clearly, in terms of human health, water is vital.

WHY WATER NEEDS TO BE PART OF OUR DAILY DIET

Like everything else vital to life and good health, water must be supplied to the body on a regular basis. Although we do derive some water from the foods we eat, relying solely on foods for water is not feasible for the vast majority of us. Instead, we must consume liquids such as milk, juices, coffee, tea, etc., (which are all primarily water) or better yet, just plain water, to provide enough water to meet our bodies' needs.

As mentioned previously, a healthy body is about 70% water. This will fluctuate a little, but our "water balance" is usually within one percent of this figure. In order to maintain a proper water balance, the average adult needs to consume the equivalent of four quarts of water each day.

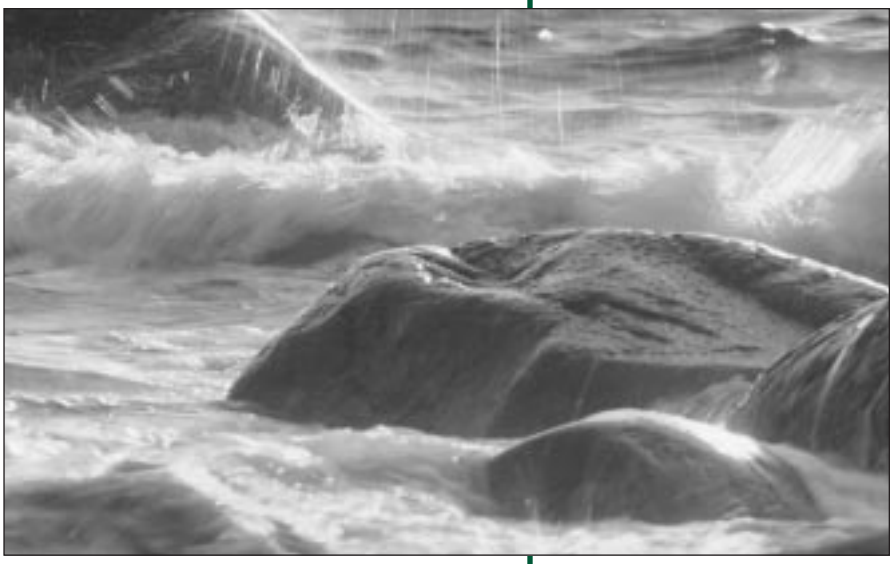
WHY CLEAN WATER IS SO IMPORTANT

If half of the water we need each day is provided by either plain water or water-based drinks, then we will consume about 180 gallons of such water each year. Over a 10-year period that's 1,800 gallons. Over a 75-year lifetime that's 13,500 gallons of water.

Typically, industrial or agricultural contaminants in water can be measured in either "parts per million" (ppm) or "parts per billion" (ppb). It is not uncommon for contaminant levels to be found at 10 ppm or even 100 ppm. But even if a contaminant is present at only 1 ppm, that could still mean a lifetime exposure to nearly two ounces of a potentially toxic chemical. Thus, even small amounts of toxic chemicals in our water can add up to much larger quantities in terms of lifetime exposure and can pose serious health risks.

"Industrial discharges, agricultural and urban runoff and accidental spills combine to make many of our rivers and streams a lethal soup of organic chemicals."

— Eckardt C. Beck, EPA Administrative Assistant for Water & Waste Management



The Effects of Drinking Polluted Water Can and Do Accumulate

Anytime we ingest anything, our bodies must do something with it. For the most part this doesn't present any problems, as long as we're consuming things that the body can easily use, store for future use, or eliminate.

The EPA estimates that the U.S. is generating more than 77 billion pounds of hazardous chemical wastes a year and that only 10% are being handled in a safe manner.

Water is very easily absorbed by the body. Once absorbed, water is easily utilized or, if not needed, easily eliminated. This is not the case for many of the contaminants our drinking water may contain. The body cannot put them to use, so it must either store them or eliminate them. Many toxic organic chemicals are fat soluble and difficult to eliminate. Other toxic compounds are simply "filtered out" in the liver or kidneys. In either case, the result can be a lifelong accumulation of highly toxic compounds. The most common site for toxins to accumulate is in the body's fatty tissue. These tissues are such an effective storage site that the U.S. Environmental Protection Agency (EPA) has actually identified many environmental toxin problems after first detecting the presence of the toxin in the fatty tissue of human volunteers. It was by such research methods that the widespread contamination of the agricultural pesticide DDT was discovered.

The Water Problem is Worse than We First Thought

Today's use of highly sophisticated measuring devices and massive amounts of comparative data have shown us that our worst fears of the 1960s are mild compared to what has actually happened to our water supplies.

Where do the Toxic Chemicals in Our Drinking Water Come From?

The three primary sources of chemicals in our nation's drinking water are agriculture, industry and municipal water treatment facilities. The chemicals they add to our drinking water resources include volatile organic chemicals (VOCs), pesticides, chlorine and trihalomethanes (THMs).

Identifying Your Water Toxin Risk

Depending upon where you live, a variety of toxic water pollutants may be hidden in your drinking water supplies. They come from a thousand different sources and are present in dozens of forms.

To simplify the test of monitoring these deadly toxins, the government has grouped them into general categories such as Volatile Organic Chemicals (VOCs) end Trihalomethanes (THMs). Instead of referring to toxic compounds with exotic and unpronounceable names such as orthoxylene and hexachlorobutadiene and bromoform, they are simply referred to as VOCs and THMs.

In addition to VOCs and THMs, the presence of agricultural toxins such as lindane and 2, 4D remain a major concern for individuals bearing responsibility for water safety. And despite efforts to reduce the risk of lead exposure, the presence of this insidious toxin in our environment is widespread.

Water in Agricultural Areas*

In virtually every region of the country water is exposed to agricultural chemicals. These are the killing chemicals used to control plant and animal threats to crops. These chemicals represent a very real threat to human health.

They include: herbicides for weeds or other undesirable plants, fungicides for molds and fungi, rodenticides for rodents and insecticides (the most common are pesticides such as lindane) for insects.

How Do Agricultural Toxins Get in Our Drinking Water?

In general, agricultural chemicals require repeated applications to provide the best results. Many of these chemicals are stable and may not break down for years. Rainfall and irrigation wash these chemicals down into the ground or across the surface to streams, rives and lakes. Experts now estimate that this 'non-point source' agricultural pollution accounts for up to two-thirds of all stream and river pollution. Eventually these agricultural chemicals could reach and contaminate surface reservoirs or underground aquifers.

Focus: Lathrop, California. Groundwater in this rural, San Joaquin Valley community has been contaminated with by-products from the manufacture of pesticides.

Water in Industrialized Areas*

Industrial water pollutants are the waste products of our industrial activity. Since the beginning of our Industrial Revolution in the late 1800s, more than 60,000 industrial chemicals have been introduced into our environment. The majority of these chemicals are safe and pose no health risk to humans as they are currently utilized. Perhaps as many as 2,000, however, have been introduced in a manner that does pose a significant threat. Of these, about 200 have been identified by scientists and researchers as toxic to human life in one form or another.

Industrial Toxins Come in Many Forms

The names of these industrial toxins and VOCs are often a complex mixture of words and numbers: THMs, TCE, Carbon 1 tetrachloride and 1, 1, 2, 2-Tetrachloroethane are just a few.

How Do Industrial Toxins Get in Our Drinking Water?

Too often the answer to the above question is that they are deposited there. For decades, industry's answer to waste disposal was dumping the waste in the closest river, lake or ocean, burying it, or spreading it over the ground. Years of these practices combined with years of rainfall have washed industrial toxins into both our groundwater aquifers and surface water drinking supplies.

During congressional review it was found that four out of five of the nation's 1,000 worst hazardous-waste dumps were leaking toxins into surrounding groundwater – and that 10% of the nation's 1.4 million underground storage tanks are leaking.

Focus: Freeport, Pennsylvania. A pipeline spill released a toxic, 200,000 gallon mixture of gasoline, diesel fuel and heating oil, contaminating 35 miles of the Allegheny River. The spill threatened the drinking water supply of one million people.

Focus: Cyril, Oklahoma. Due to groundwater contamination from saltwater, a by-product of oil field production, Cyril has been forced to rely on a new pipeline built specifically to bring fresh drinking water in from a nearby town.

Focus: St. Gabriel, Louisiana. In a 10 square mile area that includes this town of 2,100, more than 3.5 million tons (1% of the nation's total) of toxic debris is being buried, dumped in landfills, stored in surface ponds or piped deep underground.

Water in High-Technology Areas*

The Electronic Revolution of the past 20 years has brought a new set of problems to our drinking water dilemma. In order to make highly sophisticated semiconductors, computer chips, silicon wafers, etc., the electronics industry utilizes some equally sophisticated chemicals. Many of these are VOCs used as solvents, such as trichloroethylene (TCE), which government regulations require be stored in underground tanks. TCE has been found in the groundwater supplies close to many electronics manufacturers. Leaks in storage tanks or piping have been found responsible for most of the contamination. Because these solvents are based upon very small molecular structures, they penetrate the ground rapidly, contaminating underground water supplies within a matter of one or two years.

Focus: Santa Clara Valley, California. TCE, TCA and other high-tech chemicals leaking from hundreds of underground storage tanks in the "Silicon Valley" area, continue to pose a threat to surrounding groundwater supplies.

Focus: Portland, Oregon. Portland had to discontinue its traditional practice of supplementing its water supply with city wells, due to contamination from industrial solvents found leaching into aquifers near the wells.

Chlorine, Chloramines and Trihalomethanes (THMs)*

Here in the United States, we began adding chlorine to our drinking water supplies in the very early 1900s. This relatively simple step may prove to be our single greatest contribution to public health. Prior to chlorination, our drinking water supplies were often the breeding grounds and transportation system for the bacteria that cause cholera, dysentery, typhoid fever and other diseases of epidemic proportion. Today, these diseases are nearly nonexistent in the U.S. and most of the credit can be given to water chlorination.

Chlorination: A Double-Edged Sword

Chlorine is considered a disinfecting agent

because of its ability to kill bacteria and other microorganisms. It is this ability that allows chlorine to kill any disease-causing bacteria it encounters in our drinking water. It is this same killing ability, however, that has caused some researchers to question chlorine's long term effect on people. What would a little chlorine every day for 20, 40, or even 75 years do?

Chlorine and Cancer*

Though seven out of ten Americans presently drink chlorinated water, questions continue to arise concerning its potential health risk. It has been shown that people drinking chlorinated water have a 21% greater risk of developing bladder cancer and 38% greater risk of acquiring rectal cancer than those drinking non-chlorinated water.

Trihalomethanes (THMs) in Water*

As early as 1974, scientists suspected that chlorine could react with naturally occurring organic chemicals in drinking water to form a class of compounds known as trihalomethanes (THMs). By 1980, their suspicions were confirmed.

THMs appear in surface drinking water as the result of a chemical reaction between chlorine and naturally occurring organic compounds that are washed into the water by rain from surrounding forests and plains. These otherwise harmless organic materials bind with the chlorine to form THMs.

THMs are known carcinogens. Scientists have repeatedly shown that THMs cause cancer in laboratory animals. During summer months when cities are forced to add more chlorine to their municipal water supplies to kill increased bacteria growth, THM levels also rise dramatically – in some cases well above EPA sanctioned guidelines.

Focus: Washington, D.C. Even with a new, $35 million water treatment plant, the nation's capitol cannot rid its drinking water of THMs which rise 30% above allowable health limits during the warm summer months.

In most instances, THM problems only occur where surface water (lakes, ponds, rivers or reservoirs) is used for public water supplies. However, since approximately 50% of all U.S. drinking water comes from such sources, the problem may be very widespread.

Chloramines: An Answer With More Questions*

Research told scientists that the best way to avoid the THM problem was to find a form of chlorine that would not react with the organic compounds found in surface water, yet would still have the ability to kill bacteria and other microorganisms. Chloramines do just that.

Chloramines are a group of chemicals containing chlorine in a manner that still allows for disinfecting capabilities, but prohibits reaction with organics to form THMs. Chloramines have been added to public water supplies for years (they were first used by the Denver Water Department in 1917). Today, the use of chloramines is widely accepted; Los Angeles, California uses the greatest volume.

Chloramines: Toxic to Fish and People?

The EPA accepts the use of chloramines as a means of avoiding the formation of THMs in a water supply and as a disinfectant.

Chloramines are not inert additives, however, they are toxic to fish and they are harmful when absorbed into the bloodstream of humans. Like chlorine, chloramines also cause scientists to question the long-term health impact of consuming a "little disinfectant" every day for years. The health risks would appear obvious.

Don't Eat the Wrapper

Anyone who would suggest we stop using chlorine to disinfect our public water supplies would be sadly mistaken. Thanks to water chlorination, many diseases are a thing of the past in this country.

If we visualize these chemicals as the "package" our water comes in, we can discover a practical answer to the chlorine problem. Like the boxes, cans and wrappers that protect our foods, chlorine protects our water from contamination. We wouldn't think of eating a loaf of bread without removing its protective package, so why would we drink our water without first doing the same?

Filtration Removes the Wrapper

Whether our drinking water supply comes from surface water aquifers, huge public water systems or small private ones, removing the chlorine "package" is a sensible step. Filtering water right at the tap, just

before it fills a glass, is currently considered the most cost-effective, efficient and reliable method to dispose of this "package."

Consider Your Options — Carefully!

Safeguarding your family's water supply is crucial. And today, more than ever, it's clear that filtration of your home water supply is essential. There are many forms of filtration available. Few, however, can satisfy all your requirements. Here's a look at the most popular systems with specific system features highlighted:

Bottled Water

Water sold in a sealed container. Twenty five percent of bottled water sold in the U.S. is simply processed tap water from municipal water systems. A government report found that bottled water may contain potentially harmful levels of contaminants not allowed in public drinking water.

- Not always possible to know water source (in many states it is legal to bottle and sell tap water!)
- Bottles must be purchased at store or delivered.
- Electrical power required for refrigeration when using water cooler-type bottles.
- Water coolers require regular maintenance to prevent bacterial growth.
- Typical 5-gallon water jugs weigh up to 50 lbs.
- Cost per gallon: 79¢-$1.25

Vending Machine Water

Bulk water sold through an unregulated, 'unmanned' vending machine. Usually sold in half-gallon or gallon quantities.

- Not always possible to know water source.
- Who maintains the filter and how often?
- Requires sterilization and storage of jugs.
- Typical 5-gallon water jugs weigh up to 50 lbs.
- Cost per gallon: 25¢ and up.

Loose Grain Carbon Filter

As the name indicates, this filtering device is a container filled with loose grains of charcoal.

- Efficient primarily as a dechlorinator only.
- Bacteria growth can occur in space between granules.
- Water tends to 'channel.' This action seriously compromises effectiveness.
- Cost: up to $300.

Silver Impregnated Carbon Filter

This device is a loose grain carbon filter impregnated with silver to prevent bacteria growth.

- Silver is a known toxin.
- Silver prevents bacteria growth in charcoal, but does not remove bacteria from water.
- Silver does not improve filtration.
- There is a risk of silver leaching into water.
- Unit cost: Up to $300.

Reverse Osmosis (RO) Filter

This device employs a membrane to filter contaminants.

- Chlorine and other toxic chemicals cross the RO membrane with water.
- Removes minerals and trace elements essential to good health.
- Wastes 3-4 gallons for each gallon of filtered water.
- Requires electrical power.
- Usually requires professional installation.
- Requires water storage.
- Membrane requires maintenance.
- Unit cost: $200-$1,000 and up.

Distillers

This system heats and vaporizes water, then collects the condensation as the water cools.

- Removes minerals and trace elements essential to good health.
- Some toxins evaporate with the water to pass through the distilling system.
- Requires substantial electric power for operation.
- Usually requires professional installation.
- Water-cooled distillers require regular disposal of near-boiling 'flushing' water.
- Between 4 to 10 gallons of cooling water necessary to produce one gallon of distilled water.
- Requires water storage.
- Regular maintenance required.
- Unit cost: $300-$1,000 and up.

Water Softeners/Water Ionizers

These systems are not water filters. Water Softeners and Ionizers are designed to lower the 'hardness' of water, usually beneficial to household washing machines and dishwashers. Also used to prevent scaly deposits in sinks and bathtubs.

- May add harmful levels of sodium to drinking water.
- Removes trace elements such as

magnesium and calcium, considered essential to good health.
- Regular maintenance required.
- Unit cost: $1000-$2000 and up.

Compressed Carbon Block — The GNLD Water Dome® Water Enhancement Systems

A carbon block filtering system that utilizes a dense block of superfine compressed activated carbon to reduce contaminants in drinking water.

Tested and proven to reduce volatile organic chemicals (VOCs), chlorine, trihalomethanes (THMs), as well as eliminating unpleasant tastes and odors.

- Does not remove minerals and trace elements essential for good health.
- Does not waste water — provides gallon for gallon efficiency.
- Does not contain silver.
- Does not require electrical power.
- Economical self-installation.
- Requires no regular maintenance, except for filter cartridge replacement.
- No bottle storage or lifting required.
- See GNLD price list for unit cost.

Why GNLD's Water Enhancement System?

Experts agree that the only way to ensure an uninterrupted supply of clean drinking water in your home is a "Point of Use" (POW) system. Point-of-Use systems vary in technology and effectiveness. GNLD's Water Dome® Water Enhancement System utilizes the same technology used by the military and by NASA. The system is a cost effective, reliable and low-maintenance solution to the growing problem of polluted drinking water.

When GNLD's Water Dome Water Enhancement System is compared to the other similar types of products, the advantages to owning GNLD's System are obvious.

The Answer to Drinking Water Problems

GNLD has been aware of the ever-increasing threat to our long-term health that is building in our drinking water supplies. Nearly every day, new and previously unknown health concerns due to questionable water quality seem to arise. No matter where we live, the problems live with us. No matter who we are, the problems are ours to deal with. Recognizing the need for a means to deal with this serious health concern, GNLD developed the Water Dome Enhancement System.

GNLD'S Water Dome Water Enhancement System

Provides Fresh, Clean Water for Every Home

Following years of research, engineering and laboratory study, GNLD created its Water Dome Enhancement Systems. Systems so effective that they all but eiiminate a wide range of water contaminants.* Bearing the prestigious industry stamp of approval from NSF International, GNLD's Water Dome Water Enhancement Systems deliver a highly effective, yet convenient solution for clean, fresh water in every home!

**The contaminants removed or reduced by the WES may not be present in your water.*

NSF International

NSF International is an independent laboratory charged with monitoring the safety and effectiveness of water filtration products. To evaluate these factors, NSF International has developed testing procedures to monitor aesthetic quality, like taste and odors and procedures that monitor the ability to remove contaminants such as VOCs and THMs. The ability to improve aesthetic quality is evaluated under one set of tests following a procedure called the Std. No. 42. The ability to remove or reduce contaminants such as VOCs and THMs is evaluated under another set of tests following a procedure called Std. No. 53.

While some companies bear the stamp of NSF International approval, they may have passed only the aesthetic testing process.

GNLD's WES has successfully tested and certified by NSF International under both Std. No. 42 and Std. No. 53 to effectively remove or reduce a wide range of contaminants!*

**See Performance Data Sheet for more information.*