AQUA TOWER

Surviving a Water Crisis

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Contents

Introduction

Water is one of the basic essentials of life. In fact, without water, most life cannot exist for any length of time. The most important need for water is to hydrate humans and animals. The average person cannot survive for more than three days without water. The body becomes dehydrated and cannot filter and dispose of chemicals and minerals that can build up quickly and poison the body.

Even ancient people knew the importance of water, as is known by the way civilizations have developed around major water sources. In the United States, as pioneers moved West, they built their homesteads in areas where they could get water from rivers and streams. They were dependent on the rivers and streams for drinking water, watering their livestock, large gardens, and food crops that sustained them.

Large bodies of water have been a major factor in the building of America. People came from other countries to populate America by ocean passage. In the industrialization of America, rivers were the mighty forces that moved logs hundreds of miles to other parts of the U.S. for building log homes, the first bridges, and businesses.

Think about how many times per day you use water in your own home: drinking, cooking, bathing, cleaning, laundry, flushing the toilet, washing the car, watering plants/grass, and watering pets. When you use water daily, you probably do not stop and think about where the water comes from or what it costs. For the most part, Americans seem to think there is an endless supply of water and it is virtually free. While this may have

seemed somewhat true in the past, times are changing, and affordable, clean, usable water is not something that should be taken for granted!

Have you noticed how much the price of water has gone up over the past several years? The average American family is paying a higher water bill every month than they were just a few years ago. In one of every four cities in the U.S., municipal water prices have doubled over the past twelve years. In some cities, the city water prices have tripled in the same timeframe.

Families already feel the financial pressure of providing the essentials of housing, food, and utilities for their families. Wages are not increasing as quickly as utility bills. Rising water prices affect the amount of disposable income a family has available each month.

With such an abundance of water in the world, it seems strange that water prices have gone up. The thing is, while 71% of the earth's surface is covered with water, less than 1 % of it is drinkable water, and only .28% is groundwater. Groundwater is important because it is purified for drinking in most municipalities. The groundwater is purified as it percolates through the ground and reaches the aquifers. This is the main water that is used for individual needs as well as industry and agricultural needs. In other words, it is a small amount of water for such wide-spread usage and there is not always enough to meet the demands. If farmers do not have enough water to irrigate their crops, the crops die, and the food supply can be limited and rise in price due to market demand or there can be food shortages.

Nonetheless, there is a major concern that the nation's most important aquifers are drying up! The Ogallala Aquifer, which stretches across much of America, is the largest aquifer in the world. But every year, the water level drops another few inches while the water needs of the American

people constantly increases. The average American uses about 100 gallons of water per day, of which about one-half gallon is used for drinking. The water used is mostly all potable (drinkable) water because the infrastructure is such that the water piped into most homes does not distinguish between potable and non-potable water. (Though, in some areas with large natural water sources, the water for irrigating is routed for such so that purified drinking water is not used for watering lawns.)

Some municipalities ration water usage for watering lawns, washing cars, and such, but it is difficult to enforce the rationing and people have a tendency to think the rationing does not apply to them. You may have noticed that some of your neighbors water their lawns daily and for longer than is necessary in order to showcase the greenest lawn on the block. This is the type of thinking that puts severe demands on the water supply.

There is a combination of factors that contribute to the water shortage. The drought has been a problem in several areas of the nation such as the Southwest and California for several consecutive years. Additionally, there

are issues with the municipal water services getting the water where it needs to go. This raises the price of water to the consumer.

When water shortages exist, water authorities seek out other sources for water. The authorities may build dams and canals or drill tunnels for water. These projects are large-budget. Even though bonds pay for most of the projects, the bonds eventually have to be paid off, and the customer bears the burden of that.

The majority of our water infrastructure is around 50 years old and is reaching its life expectancy. In many ways, the infrastructure is failing. It is estimated that there are over 240,000 water leaks per year that require replacement of water mains. The leaks cause the loss of thousands of gallons of water before they can be fixed. The repairs are also labor-intensive and very expensive. The ASCE estimates that more than one trillion dollars are needed to fix the system for use over the next several decades.

Constantly rising personnel costs and government regulations have created a further rise in water prices. Since the terrorist attacks of 9/11, security costs for the U.S. water supply have skyrocketed.

Finding a solution for the rising price of water and the looming shortages is a modern problem that our society faces. There are different opinions on how the problem should be solved. One opinion is that the infrastructure should be rebuilt and another is that utility companies should be privately owned and managed differently. Government agencies do not worry about making profits but take a political stance. Private companies focus on making a profit and can usually manage a business much more efficiently than government agencies. To make a profit, they must repair the

infrastructure and pass the expenses of the company on to the consumer. The rising costs make it difficult for poor customers to pay for their water. Private companies turn off the water service when water bills are not paid. Advocates for poor people having water even if they cannot pay for it say that is a good reason not to privatize water.

Whether water service is operated by the government or a private company, the consumer pays for the rising costs on their water bill or through paying taxes. But the rising cost of water is not the only thing that should concern U.S. citizens. The fact that the government, specifically the EPA, is working to take ownership of *all* the water in the United States should be a great concern. The EPA already has control of all navigable waterways in the country, including waterways that are only sometimes navigable. This means if there is an arroyo that fills with water during the rainy season, creating a navigable waterway, the EPA can control it.

A waterway is considered navigable if some part of it can be used to transport interstate or foreign commerce, and if any part of the water meets this definition, the whole body of water meets the definition. The EPA includes all tributaries in the definition and is working to have the word *navigable* removed from the definition, which would give them control over *all* waterways. This means the small streams and creeks that might be depended on and used for water for your family in the event of an emergency. It may also mean that the EPA can claim your land and declare it “off limits” if you have water on your land. Many people have had their land designated as “temporary wetlands” or other types of protected lands and have been removed from their own property or been told that they

cannot build a house on their own property or otherwise use it as planned. Do you see the problem with this type of scenario?

The EPA isn't the only government organization that is trying to take water rights away from the people. Some state organizations work with the EPA and help pass laws that take away water rights or make it difficult for people to retain control over water on their land. As an example, in many states, a landowner must purchase very expensive permits to drill for water on their own land. The cost of permits and drilling companies is too exorbitant for many, if not most, landowners.

You have probably also read or heard in the news about how some states are making it illegal to collect rainwater. This is yet another ploy to keep people dependent on the government for the essentials such as drinking water. There is no better way for the government to be in complete control than to control the water supply!

Today, the control of water may seem to affect only a small part of the population such as farmers who need water for irrigating their crops. But eventually, and probably sooner than you want to think, the water control and resulting water shortages will affect every individual in this country if the political agenda does not change and our water infrastructure is not repaired and secured. Additionally, it is *now* that Americans need to fight for the freedom to develop their own water supplies without government interference. It is also the time for Americans to hope for the best and prepare for the worst! It's time for Americans to develop their own water sources and purification methods so that there is the assurance of drinking water no matter what the government does or what the circumstances are in the United States.

If you think this is impossible, read this guide. In this guide, you will learn the whole story about water—where it comes from and a look at the water crisis in the United States and in other countries. You'll see that there is a need for you to take action due to the crumbling water infrastructure, political agendas, and water mismanagement. But you won't be left hanging without the important information you need to prepare for a water supply. This guide will provide you with well-researched, solid information. Rest assured that you can create a comprehensive plan to provide yourself and your family with drinking water when the time comes that you cannot depend on the government for the necessity of water.

Where Does Your Water Come From?

From the time you get out of bed in the morning until you return to bed at night, you use water, and you probably mostly do so without even realizing that's what you're doing. You are thirsty after a good night's sleep so you drink a full glass of water first thing every morning. You use water to prepare your smoothie and clean up the blender before you head to the gym. During your workout, you probably swim a few laps in the gym pool, then you use water to shower after working out. On your way to the office, you drink several ounces of water as you are thirsty from working out. You stop by your favorite breakfast spot and grab a cup of coffee or tea (made with water) and a breakfast sandwich, which required the use of water for the employees to wash hands, wash dishes, clean counters, etc. Water was used to manufacture the paper dishes and napkins. You've only been out of bed a few hours and you've already "used" several gallons of water. As the day goes on, you will use several more gallons of water.

Water is an essential part of everyone's day. No one really thinks about using water. It's always there when you turn on the faucet for a cold drink of water or for a morning shower. The rivers and lakes are there for boating, fishing, and recreational use. Water sprays from the hose when you wash the car or from the sprinklers when you soak the lawn or garden. Water is just always there. But have you ever thought to stop and think about where the water comes from before it comes out of the faucet?

The water that is used every day for cooking, cleaning, bathing, and drinking comes from one of two sources: ground water or surface water.

Ground Water

Ground water comes from precipitation in the form of rain or snow that falls to the surface of the earth and sinks into the ground, filling the open spaces within the layers of sand or gravel beneath the surface. The layers of sand and gravel in this subsurface that are completely saturated with water are called *aquifers*.

Aquifers are huge geological formations that contain enough water to supply a well. The water is pumped from the well to the surface where the water goes through a treatment process and is pumped into storage tanks. From the storage tanks, the water is distributed through pipes that run underground and to homes and businesses. From there, it comes out of the faucet.

As you can imagine, aquifers are a very important part of the water supply system. Many towns and cities are dependent on the aquifers as their main water supply for their citizens. As an example, two-thirds of the residents of the state of Louisiana rely on ground water for the water they drink and use daily. A whopping seven billion gallons of water is pumped from aquifers in Arkansas every day! (This figure is up by 400% since 1965.)

Surface Water

Surface water is the water that is in lakes, rivers, wetlands, and other bodies of water. Surface water is pumped from the body of water to a treatment plant for purification and then distributed through underground pipes to homes and businesses in the same way as ground water.

Water Systems and Distribution

Whether ground water or surface water, the water comes to your home or business from a community water system or a private well. About 85% of Americans receive their water from community water systems and only about 15% receive their water from a private well. Community water systems are monitored by the Environmental Protection Agency (EPA), which is an organization of the Federal Government. Private wells are not governed by the EPA and private well owners are responsible for the safety of the water from their wells.

The earth is a closed eco-system, meaning that the water on the earth is the same water that has been on earth since the beginning of the earth. About

99% of the water on earth is ocean water. The same water is recycled over and over. There is no *new* water whether the water is ground water or surface water.

One percent of the water on earth is drinkable (potable) and usable for household purposes such as bathing and cleaning. All of this water comes from rivers, lakes, streams, ponds, creeks, or underground sources. Even though the water is sourced from natural sources, it must be treated to be safe for human consumption. The treatment process includes several steps:

- **Storage Reservoirs**—Until it is time for the treatment process to begin, water is stored in reservoirs that may be manmade lakes or rivers, huge ponds, dammed up rivers, or tanks.
- **Mesh Screens**—The water goes from the reservoir to running through mesh screens that will help remove large objects such as sticks, rocks, and debris. The mesh screens do not remove small particles such as bacteria, which will be removed in another step of the treatment process.
- **Additives**—Additives are put in the water to cause the remaining unwanted particles to bind together. The goal is to have a fewer number of large clumps, known as floc, instead of millions of tiny particles in the water for easier removal. The result of this treatment step is called flocculation. Next, the water is quickly mixed with a flash mixer.
- **Clarifier**—In the clarifier, the floc becomes sludge and is separated from the water. The sludge floats on top of the water in what is known as a “sludge blanket rather than floating around in the water.

- **Rapid Gravity Filter**—The rapid gravity filter removes the sludge blanket by implementing a process called backwashing where the water is run through sand or a similar substance.
- **Ozone Gas Injection**—Ozone gas injection is used in conjunction with the granular activated carbon step only for river water to remove fine particles that have stayed in the water.
- **Granular Activated Carbon Treatment**—For this step of the treatment, the water is run through carbon granules.
- **Chlorine**—Chlorine is added to the water to kill bacteria and harmful organisms.
- **pH Levels Checked**—The water pH levels are checked so that the water is balanced and not too acidic or too alkaline.
- **Water Distribution**—Now the water is ready to be distributed.

The process for making water safe to drink seems simple and straightforward. However, the process doesn't always go as it is supposed to and much can go wrong, meaning that the water that enters homes and businesses is not always as safe as it should be and that there are or could be severe shortages of safe drinking water. In fact, there are entire countries where there is a severe water crisis! And there are factors that could lead to unsafe water and water shortages here in the United States. In the next unit, take a look at four countries that face or will soon face a water crisis and why. You might be surprised to see one of the names on the list!

The International and National Water Crisis

Four of the world's nations that are experiencing or are highly likely to soon experience a water crisis are China, Libya, India, and… the United States of America. Are you surprised to see the United States on the short list? There are many factors that could lead to a water crisis in the U.S. Let's take a look at the other countries first so you can understand why the U.S. is on the list.

China

China is the most populated country in the world, where 15% of the world's population lives. But with 15% of the world's people, China controls only 7% of the world's water resources. It does not take a mathematician to figure out that China is a country in crisis when it comes to having an adequate future water supply for its massive population. Look at the following facts:

- Rivers and lakes in China are drying up
- 70% of lakes and five of China's largest seven rivers are no longer suitable for human contact according to China's Environmental Protection Agency
- By 2030, China's water consumption will reach 100 % of capacity

The government of China has told its citizens that the only hope of avoiding the water crisis in 2030 is to significantly increase the efficiency of water usage and embrace an aggressive emergency initiative. It is not yet clear if this will happen or not.

Libya

Although there is currently no water crisis in Libya, the country is 90% desert and has severely limited natural water resources to depend on to provide water for its people. To help the situation, in 1983, the Libyan government initiated the Great Man Made River Project (GMMR). The GMMR, which cost about $60 billion, uses the water that was discovered in abundance under the ground to create a massive water supply system that adequately sustains the country's home and agricultural water usage. This massive system makes Libya a vulnerable target for enemies of the country because the country depends on it almost entirely for water. If the water infrastructure was destroyed by enemies, this desert country would be in trouble!

India

India ranks second as the most populated country in the world, but many experts say that, without a change in population increase, India's population could surpass China's by the year 2050. India's population continues to escalate, but their water supply is dwindling due to gross mismanagement of the country's water resources, excessive pollution, and climate changes. It should be noted that India does not have any laws or regulations regarding water usage or water pollution. The conditions are horrible as raw sewage is dumped into the river and causes the water to be unsafe for millions of people in India.

India's fragile water infrastructure is completely crumbling and there does not seem to be any revitalization of the system. If the system remains as it is today, India's water crisis will continue to grow as its population grows along with the pollution.

United States

The United States is a great country and leader of the free world. In times past, the U.S. has not been categorized with poor countries such as India in terms of providing safe water and clean food for its people. Americans believe their country's government would not allow such a failure for provision. But it is time for Americans to face the reality and truth of the water situation in their country:

- **Failing Levees.** Many states are struggling with having enough water for the people of their state. The great and heavily populated state of California is probably the best example of this. California's water issues have been brought on by drought, population growth, increased water demands, climate changes, inadequate storage facilities, and aging infrastructure.
- The Sacramento River provides water for over 26 million residents in California. The Sacramento River Delta is a series of thousands of miles of levees that keep the water contained. Experts with the

Association of California Water Agencies says that the levees are two types: those that have failed and those that will fail. One great possibility for the failure of the levees is for a strong earthquake of 6.7 or greater on the Richter scale to hit the area, which has been predicted to happen in the next 30 years. With the failure of the remaining levees in California, the state will quickly lose most of its water without any solution for quick recovery from the disaster. California is not the only state that depends on the levees that are failing.

- **Mining and Development.** There is a significant threat to the water of the Roanoke River, which supplies drinking water to more than one million people in the Hampton Roads area of Virginia. The threat is that the Commonwealth of Virginia is considering opening the door for uranium mining. While this may seem like a good way to boost the local economy, in reality, the waste produced from the mining would threaten the purity of the drinking water produced by the Roanoke River. These types of political and economic decisions are threatening water sources in hundreds of communities across the United States.
- **Pollution.** The Chicago River is a man-made river that supplies water to over six million Chicago residents. However, the river is on National Geographic's list of the "Top 10 Endangered Rivers," because of the 1.2 billion gallons of raw sewage that are dumped into the river daily. Yes, you read that correctly—1.2 BILLION gallons of raw sewage DAILY is dumped into the Chicago River.
- **Contamination**. Contaminates are a serious problem with the water supply throughout the United States. Consider the community

of Hinkley, California that is located in the Mohave Desert near Barstow, California. You may be familiar with the story of Hinkley because of the well-known Erin Brockovich true story and movie. Hinkley is the home to a compressor station for massive natural gas transmission pipes, which are operated by Pacific Gas & Electric. During the years between 1952 and 1966, the water that was used in the cooling towers to cool the compressors contained hexavalent chromium to keep the equipment from rusting. When the water wasn't being used in the machinery, it was stored in unlined ponds. The water leached into the ground water and the water that the people of Hinkley drank and used for cooking, bathing, and cleaning became highly contaminated. Even after efforts for cleaning up the mess, to this date, the water remains contaminated and many of the people of Hinkley paid a high price for the contamination—their health. Pacific Gas & Electric says it will take 150 years to complete the cleanup of the Hexavalent chromium in the water supply. This is just one well-known case of water contaminants. There are many more stories of contaminants that affect the safety of the water supply throughout the United States.

- **Drought.** In recent years, the U.S. has experienced serious drought conditions. In 2011, Texas was recorded as having the worst drought in the state's history. Ninety-two percent of the state experienced extreme or exceptional drought and the Federal Government declared all 254 Texas counties as natural disaster areas. In Arizona, ranchers had to sell off their cattle because they could not feed them during the drought conditions that plagued much of the state. Oklahoma and several other states have also experienced severe

drought conditions that affected water supply and irrigation of food crops, creating a double threat and shortage of both food and water.

Yes, it would be very foolish for the American public to feel smug about the safety, availability, and security of the water supply. Rather than assume that the water supply is safe and secure, the citizens of the United States must come to the realization that failing levees, drought, contaminants, pollution, and economic and political agendas create insecurity in the water supply. It is time to think about how you can secure water for yourself and your family for when the water crisis becomes severe. *After* the crisis hits, it will be too late to prepare.

Is America's Water Safe to Drink?

In the United States, many people assume that the government is honest and open about the safety, purity, and availability of the public water and food supply. With this assumption in mind, most believe that the government has the best interest of the public at heart and that the public reports of a safe and clean water supply are accurate. One does not have to do much research, nor do they have to be a "conspiracy theorist" to find out that the reports prepared for the public do not reveal all the facts and are carefully worded to avoid revealing too much information. That is why it is so important for each person to do their own research by reading guides such as this one. In this chapter, you can see the facts and determine if you think the water supply in the United States is safe for human consumption.

Do you believe the supply of water in America is protected and secure so that the public can count on clean, safe drinking water? Given what the public is told, one might think so. But it is what is *not* being said and not being done that must also be heard!

Congress passed the Safe Drinking Water Act (SDWA) in 1974. The SDWA was supposed to establish consistent standards for the nation's drinking water. The standard was the maximum level of certain substances that the EPA would find acceptable in drinking water. In 1986, the SDWA was amended. The amendment required the EPA to publish standards for 83 specific contaminants and additional standards thereafter. The water that is provided by community water systems is supposed to adhere to the SDWA standards and not contain contaminant levels higher than the standards of the SDWA, its amendments, or the state regulations for the water supply.

However, it is a fact that many community water systems across the nation do not meet the SDWA standards and people are drinking and bathing in water that is filled with dangerous chemicals and pollutants. Here is the reality of what some community water systems are doing:

- In Tacoma, Washington, 28 chemicals were found in the drinking water. Seventeen chemicals are found at levels that exceed health guidelines for chloroform, lead, and manganese. In fact, the manganese level exceeds the *legal* limit.
- In Prince George County, Maryland, 31 chemicals were found in the water. Thirteen chemicals exceeded health guidelines for bromoform, chloroform, and trichloroacetic acid. The trichloroacetic acid surpassed legal limits.

- In Philadelphia, Pennsylvania, 12 chemicals were found in the water and eight of the chemicals exceeded health guidelines for chemicals including arsenic and Radium-228.
- According to FluorideAlert.org (http://fluoridealert.org/articles/50-reasons/) in an article titled "50 Reasons to Oppose Fluoridation," Dr. Paul Connett notes that about 70% of the public water supplies in the United States are fluoridated, meaning that approximately 185 million people drink fluoridated water. This number accounts for more than half of the worldwide number of people drinking artificially fluoridated water. Most developed countries do not artificially fluoridate their water and in countries where water is highly naturally fluoridated, steps are being taken to remove the fluoride from the water. In the United States, the government determined that fluoridation in the water would help prevent tooth decay. To the contrary, even though the water has been fluoridated for many years, tooth decay is still high in children in poor communities. New research that is based on a study of over 39,000 children from 84 communities shows that the fluoridation in the role of preventing tooth decay is highly doubtful.
- So what's the big deal about fluoridation? It must be safe or the government would not allow it—right? Wrong! In 1986, the EPA established a maximum allowable concentration of four milligrams of fluoride per liter of drinking water, but according to the Committee on Fluoride in Drinking Water of the National Research Council, even this amount of fluoride in drinking water is too high to be safe. Yet, the same report stated that mover 200,000 Americans live in

communities where the fluoride levels exceed four milligrams per liter of water.

- Too much fluoride in the water can create the risk of severe tooth enamel fluorosis and increase the risk of bone fractures. Studies have shown that drinking fluoride consistently can increase fluoride levels in the blood, which can lead to stiffness, achy joints, thyroid problems, and cognitive issues. Dr. Dean Burk, Ph.D. and with the National Cancer Institute for 34 years says, "In point of fact, fluoride causes more human cancer death and causes it faster than any other chemical." There is much research to support Dr. Burk's findings. Yet, most communities artificially fluoridate the water that is distributed to homes for drinking. Does this sound like the government has the people's best interest in mind?
- Did you know that your drinking water may contain high levels of arsenic? According to the film "In Small Doses," which reports on the presence of arsenic in drinking water in the U.S., over 20% of wells in some areas of the U.S. may have levels of arsenic that is not considered safe levels for human consumption. Arsenic is not just present in wells but is also found in community water supply systems. Arsenic is a known carcinogenic and can create long-lasting serious health issues when the levels of consumption are too high.

These are just a few examples that mirror the conditions of community water supplies all over the country! The substances that community water supplies contain cannot be ignored by people if they care about their health and the health of future generations! Do you know what is in the drinking water in your city?

The Vulnerability of the Nation's Water System

As though the chemicals in the water supply is not bad enough, the nation's water system is very vulnerable to collapse. Yes, you read that right! And here are the reasons for the statement:

- **It is an old, crumbling water infrastructure.** At this time, the nation's water system is old, outdated, and unreliable. Every day, the crumbling infrastructures across the nation are getting worse. Every day in the United States there are more than 850 major water main breaks! Not only does this create short-term water shortage, but it creates problems for thousands of residents who try to function without water for days or weeks while the broken pipes are repaired or replaced in that area.
- The pipes that make up the majority of the country's water system were installed decades (in some instances, *centuries*) ago and they are severely corroded. Most of the pipes need to be replaced as they have been repaired over and over again to avoid the major task and expense of replacing the pipes. Had the pipes been replaced when they first needed to be, the task would have been much more doable. Now the problem is so severe that it is a major undertaking and enormous expense to an already taxed national budget. According to a 2009 EPA report, it would cost $334.8 billion to overhaul the water system!
- **The water system is outdated.** The nation's water system was, of course, the state of the art when it was built. Iron pipes were used, which was considered the best at the time, but now it is known that

iron pipes used to transfer water can have mineral buildup that causes blockages. The blockages then cause the pipes to leak or burst. Some states, including Washington, South Dakota, Pennsylvania, and Alaska still use wood pipes that are fashioned like wine barrels with wood planks bound by strips of metal. You can imagine how much those pipes leak! To make matters worse, when pipes leak, disease-causing microorganisms can infiltrate the water supply at critical stages *after* the water has already been through the treatment plant and is on the way to people's homes. The broken water pipes can significantly impact people's lives. In Maryland, in 2008, there was a major water main break and so much water gushed from the broken pipes that the area flooded and people had to be rescued from their homes by helicopters.

- **The water system has unreliable delivery and delivers unsafe water.** As you have already read in this guide, much of the water supply in the United States contains pollution and high levels of unsafe chemicals that exceed the maximum allowed by the EPA. This problem is often made more severe by the outdated and failing infrastructures. The water is transported through lead pipes. The lead from the pipes can leach into the treated water as the pipes have corroded. The water that goes into the homes and businesses for drinking water can be contaminated with lead.
- **Combined Sewer Overflows (CSO) and sanitary sewer overflows can affect the water.** Combined sewer systems collect sanitary sewage and stormwater runoff in a single pipe system. In some areas in the Northeast, Great Lakes region, and the Pacific Northwest, among others, millions of people are served by combined

sewer systems. Sanitary sewers are systems that are designed specifically to transport sewage from homes and businesses to treatment plants or disposals. They also transport industrial wastewater. Sanitary sewers are a necessity, but they, along with the combined sewer overflow system can cause major problems when they overflow, which happens frequently. According to a 2004 report from the EPA to Congress, an estimated 9, 348 overflows happen in the U. S. yearly. The overflows disperse about 850 billion gallons of untreated wastewater and stormwater into the environment. This does not include the 23,000 to 75,000 overflows of sanitary sewers and the additional three to ten billion gallons of untreated wastewater caused by the overflows that the EPA estimates happen yearly in the U.S.!

How Drought Can Poison the Water System

Drought is not just a serious problem because it does not permit farmers to water their crops during the hot summer months. Drought can also cause the water system to become poisoned. How? During a drought, both groundwater and surface water supplies are severely reduced as there is no precipitation to offset the depletion. During a drought, temperatures are usually higher than usual for the given time of year, and the high temperatures can lead to reduced oxygen levels in the water, which can then affect the aquatic life of the body of water.

Drought also causes increased levels of pollution to enter the water supply. During a drought, there is reduced stream and river flow and lower water

levels can cause stagnation, which increases the concentration of pollutants.

Fires happen more frequently and are more severe during times of drought. Fires related to drought are a source of contamination to water sources as they cause runoff that carries charcoal, ash, woody debris, and sediment to the surface water. This kills fish and other aquatic life that can pollute the water and disperse bacteria that causes infection and health issues that come into contact with it. This type of contamination can have long-term effects. As an example, the people of Denver, Colorado suffered from contamination effects after the Buffalo Creek Fire of 1996 when the water supply became so contaminated that the community water supplies were cut off and one of Denver's water treatment plants was closed. The water supply reservoir had to undergo extensive cleaning before the water service was restored. In the interim, a local beverage manufacturer supplied bottle water for the residents as there was no other water available.

During times of heavy drought, the groundwater supply is not secure, either. Many communities throughout the U.S. depend on groundwater that is stored in underground aquifers. These aquifers are replenished by precipitation in the form of rain or snow. When there is not enough rain or snow to replenish the aquifers, the water levels quickly drop, particularly if the drought is severe and lengthy. The drop in water levels often results in community water systems putting severe water use restrictions in place. The impact on the consumers can range from being mildly inconvenient to being harsh and stressful.

Water use restrictions can happen even in places that are considered to "water-rich" states. In 2001-2001, Maine experienced the worst drought it

had seen in over thirty years. The surface water in lakes and streams, as well as the ground water supplies, dropped to record low levels. The state was not prepared for the drought, and many of the state's community water systems had to significantly restrict their customers' water use. Even those with private wells were without water as the private wells went dry due to the drought.

According to the Center for Disease Control's National Center for Environmental Health, periods of drought have increased in the U.S. over the past few decades. It is projected that the droughts will become more frequent and last longer, particularly in areas such as the Southwest. Drought is a serious threat to our water supply. No matter where you live in the United States, you can experience drought if the precipitation levels severely drop off.

Chemtrails Can Affect the Water Supply

Not only is there great concern for what is happening to the land in the U.S., but there is a growing concern for the chemtrails that are now so prevalent in the skies over the United States. Chemtrails are nothing new. There is documentation that shows that the aero spraying has been going on for decades. The chemtrails are caused by the government-sanctioned dumping of aluminum and other heavy metals into the atmosphere. The public is told that the purpose of loads of aluminum and other metals being dumped into the atmosphere is to stop the impact of global warning, but the geoengineers that oversee this attempt to manage the changing climate

have a different story to tell. Their story is that the goal is to spray between 10 and 20 million metric tons of aluminum into the air every year.

As they should be, people are concerned about how the spraying of the toxins has and will continue to impact the health and well-being of the people of this nation. The chemtrails can prevent organic gardening, which could mean that, eventually, only pesticide-drenched and contaminated food would be available. Chemtrails can also impact the water supply as the tiny particles of toxic metals fall to the earth and contaminate the water supply.

There is much information available about chemtrails and how it affects the people of the United States. If you are interested in reading more, check out the following resources:

- See Michael J. Murphy. "What in the World Are They Spraying?" March 3, 2010:www.countercurrents.org/murphy030310.htm ; and G. Edward Griffin. "Chemtrail vs. Contrail" April 14, 2010:www.youtube.com/watch?v=rsWpSPBwA-w
- Carole Pellatt. Connections. "What's going on in the air? Yes, we are being sprayed." Aug. 8, 2007: http://homepage.mac.com/carolepellatt/yeswearebeingsprayed ; and http://homepage.mac.com/carolepellatt/MATRIX/INDEXCHEMTRAILS.html

The Fukushima Fallout

The threats to the United States' water supply is not limited to what happens in this country. When the nuclear meltdown at the Fukushima Daiichi nuclear plant in Japan happened in 2010, experts predicted and told American citizens that the tainted water would concentrate only on the West Coast. It is now known that the tainted water has been found in a variety of other places in the U.S. including Philadelphia, Niagara Falls, Boise, and Oak Ridge Tennessee. This indicates that the fallout from Fukushima was considerably more widespread than originally thought. It brings up concerns for the future water supply across the nation, as there is no solution for stopping the fallout from entering the water supply in the U.S., and the typical water treatment systems used in the U.S. cannot effectively remove the effects of nuclear fallout.

When the nuclear power plant meltdown happened in Japan, the people of the United States were told that there was no threat of fallout to our country, but reports from the EPA show otherwise: Testing done in April 2010 revealed that 23 water supplies in the United States had been tainted by the fallout of the Fukushima incident and had higher than acceptable levels of Iodine-131. That may not be the worst of it. The EPA tests for Iodine-131, but they do not test for Cesium-134 or Cesium-137, which have the potential to be even more harmful than Iodine-131. The public may be drinking water that is heavily impacted by Cesium-134 or Cesium-137 and not know it!

Is Bottled Water the Answer?

Many people think that bottled water is the answer for natural water shortages and water pollutants. Upon examination of bottled water, it is clear that it is not the answer for drinking water! Bottled water is not as stringently regulated as water from your tap and it often contains even higher levels of bacteria and pollutants than tap water.

At least, tap water is regulated by the EPA and that offers a modicum of protection for safe drinking water, even though the EPA regulations are not always followed. Bottled water is tested far less frequently than community water supplies as bottled water is labeled as a food product under federal guidelines and falls under the authority of the Food and Drug Administration (FDA). While the EPA mandates that community water systems test several times per day for harmful microorganisms in the water, bottled water companies are only required to test their water once per week. Municipal water systems are also required to test for chemical water contaminants four times more often than bottled water companies. The

FDA also provides loopholes to some bottled water companies so that if the water is sold in the same state in which it is bottled, few or no tests are required. This is so, even though when bottled water is tested, the results for purity are not good. Studies have shown that a significant percentage of bottled water contains more bacteria than the FDA's lax guidelines allows. Bottled water also often contains industrial chemicals that are not usually found in tap water because of the way the plastic bottles are manufactured and then the harmful chemicals such as phthalate leech into the water.

With bottled water, the consumer is left in the dark. The bottled water companies are not required to provide any of the reports that the EPA requires of municipal water systems. When it comes to bottled water, the safety of the water is squarely on the shoulders of the company. It would be nice to think all bottled water companies would show the integrity to test their water and ensure that there are not harmful chemicals and microorganisms in it, but unfortunately, that is not the case. And for that reason, it doesn't seem as though bottled water is the best solution for long-term drinking water.

The Water is Running Out

You are now familiar with many of the problems with the United States' water supply. It is clear that the water supply infrastructure is failing and much of the water is contaminated with pollutants and chemicals. But it gets worse! The water supply in the United States is running out!

When you consider that there is no new water on earth and that the same water is recycled over and over through a natural process, it is clear to see that the water supply is finite. Contrary to the way Americans think about water and use it as though there is an unlimited supply, there is simply not enough water and the water could run out. Some scientists believe that due to increased demand for water and climate changes that affect water, the water supply in the United States could run out as soon as 2030. If you remember correctly, you read earlier in this guide that it is also predicted that China will run out of water in 2030 also. Yes, it could happen here as easily as it could happen in China.

The Aquifers

A significant factor in the imminent collapse of the United States' water supply is the diminishing water in the aquifers that many states are fully or partially dependent on for their drinking water. Louisiana is one of the main states in this category. Two-thirds of the residents of Louisiana obtain their water supply from groundwater stored in underground aquifers, and for many years the aquifers have done their job well, but they are now being tapped out by the increased water demands and other factors.

The Ogallala Aquifer clearly illustrates the aquifer situation in the United States. The Ogallala Aquifer is located in the Great Plains region of the U.S. The aquifer was formed when water from retreating glaciers and streams from the Rocky Mountains flowed out onto the permeable sand and gravel of the plains. It is estimated to be about 10 million years old. was first tapped for irrigation in 1911. Covering an area of 174,000 square feet, the Ogallala is the largest aquifer in the world, even though parts of the aquifer are shallow. It runs through and provides water for the people of Nebraska, Wyoming, Colorado, Kansas, Oklahoma, New Mexico, and northern Texas. However, because of the current lack of glacial water melt, the aquifer is not being replenished as quickly as it needs to be to keep the water level where it needs to be to adequately supply water for the increasing population of these states.

Some of the municipalities that rely on the Ogallala Aquifer for their water supply have realized the problem of the shrinking water levels and understand that the problem will continue to get worse as water consumption rises and the aquifer is not replenished. In some areas, steps are being taken to resolve the issue, but aquifer recovery can be a long process. In some instances, municipalities have waited too long to tackle the problem.

Experts estimate that current irrigation practices could use up half of the Ogallala Aquifer's water in the next decade. Unless the aquifer is replenished within the next decade, the results could be catastrophic for the millions of people who depend on the water source.

As America's people continue to increase their water usage, the population grows, and other factors continue to contribute to the depletion of the Ogallala, the aquifer could be one of many aquifers that collapse.

Natural Disasters and Other Water Threats

Storms

Natural disasters are another continual threat to the world's water supply. Flooding can cause contaminants to enter the water supply, making the water unfit for drinking. Hurricanes and tornadoes can interrupt water service to customers who rely on municipal water supplies. During severe winter storms where ice and snow cause the electricity to shut down for an extended period of time, the water treatment facilities may not be able to operate at full capacity or at all.

Open Aqueducts

Open aqueducts are common in some areas such as California, leaving the water supply vulnerable to tampering and contamination. Agricultural and industrial spills can also cause unwanted runoff to enter the aqueducts and pollute the water supply.

Through careless practices, people can unintentionally contaminate the aqueduct. More than once, fun-seeking teens have been caught swimming in municipal water tanks! In many small towns across America, the authorities try to keep watch over the water tanks that are often located in public areas as teens seem to like to dare each other to climb the water tower and spray paint graffiti to prove they were at the top of the tower.

People may also unknowingly be disposing of chemicals or industrial strength products in a way that can affect the water system.

Those with malicious intent may also have access to contaminate the water supply as a means of revenge or warfare against the United States. Terrorists understand that all commerce and healthy living in the United States would come to a screeching halt if the nation's water supply became contaminated or was severely limited.

According to a report written by the Presidential Commission tasked with presenting a case for increased security measures of the United States' infrastructure, in short, three factors are crucial for the American people to have the water they need for survival:

- There must be adequate quantities of water to meet the demands of the people.
- The water must be delivered to the people in a safe manner and at a sufficient water pressure level.
- The water must be safe for human consumption and use.

Any actions, intentional or unintentional, that affect these three factors can be destructive and cause the American people to be vulnerable to the realities of not having the water they need.

Terrorism

Besides the dangers of chemicals and pollutants in the water supply, Americans are faced with another very real, ongoing threat to their water supply—terrorism. The U.S. Government has been aware of the grave reality of potential terrorist attacks against our country and specifically against the water supply for decades. Just before the Japanese invasion of

Pearl Harbor in 1941, John Edgar Hoover, then director of the FBI, wrote this chilling statement, "It has long been recognized that among public utilities, water supply facilities offer a particularly vulnerable point of attack to the foreign agent, due to the strategic position they occupy in keeping the wheels of industry turning and in preserving the health and morale of the American populace." Even though the United States has progressed tremendously, especially in technology, since 1941, the vulnerability of which the statement speaks applies just as much today as it did then. An attack on the nation's water would devastate America today just as it would have in 1941, and probably even more so because Americans have become so accustomed to having tap water and convenience at their fingertips.

There are various ways that terrorist groups or individual terrorists could infiltrate the water supply in the United States:

- **Physical Destruction** is a real possibility with the easy access that terrorist groups and individuals have to explosives and guns that could be used to physically damage or disable the system. Terrorists could damage or disrupt the power source or other interdependent infrastructures such as telecommunications. Additionally, they could destroy or disable one or several operating or distribution system components. Chemical containers, particularly chlorine, could be destroyed to release the chemicals into the water supply. Supervisory control and data acquisition (SCADA) systems could be physically destroyed, leaving the system in chaos. Aqueducts, raw water reservoirs, and pumping stations are also always vulnerable to physical terrorist attacks. The water system would be severely disrupted if terrorists opened and closed major valve controls too

rapidly and caused multiple simultaneous main breaks. This would disrupt the water supply to millions of people and create a loss of water pressure that could hamper firefighting capabilities. Can you imagine the chaos and lives lost in that type of scenario?

- **Bioterrorism and Chemical Contamination** are types of attacks that terrorists could use to render deadly water for the American public. *Bioterrorism* is a term that defines massive contamination by a microbiological agent and chemical contamination is exactly what it sounds like, which is the contamination of the water supply with chemicals. Both bioterrorism and chemical contamination are capable of producing mass casualties. Historically, any agent that has this capability is considered to be a weapon of mass destruction (WMD). In the past, the focus of bioterrorism and chemical contamination was on the aerosol form, but now, many government agencies are focusing research on the waterborne viability and resistance to disinfection of such agents as anthrax, botulinum toxin, smallpox, tularemia, and hemorrhagic fever virus, which are Category A biological agents. Experts agree that waterborne agents that have a low infectious dose, produce severe gastrointestinal disease to a public recipient that has little or no immunity, and results in a high percentage of systemic complications that lead to death are the ideal weapons of bioterrorism. Today, those agents are available to terrorists and the water supply is vulnerable to the actions of the terrorists.
- **Backflow** occurs when non-water materials are introduced into the water distribution system. Backflow is another way that terrorists could attack the water system. Backflow can happen through fire

hydrants and can be done intentionally or accidentally. As an example of how backflow can happen accidentally through a fire hydrant, consider the Charlotte-Mecklenburg Utilities incident. Aqueous fire-fighting foam was distributed through the system through a fire hydrant when a fire truck pump was turned on before a valve was closed to prevent the distribution of the foam. More than 60 gallons of foam was distributed into the community's pipes and taps. While this example was an honest accident, it shows just how easily poisons, chemicals, or toxic agents can be distributed through the water system.

- Almost every home and building on a community water system have unprotected access to the distribution system. It would be a piece of cake for terrorists to use fire hydrants to tamper with the water supply in a neighborhood or pressure zone without it being detected. A fire hydrant can hold 17 gallons of water. With the contamination of that many gallons of water with toxic substances, thousands of people could die very quickly from drinking the water. Unless a guard was stationed at every fire hydrant in the U.S. twenty-four hours a day, seven days a week, there is currently no easy solution for the problem of terrorists possibly using fire hydrants as a weapon to kill thousands or even hundreds of thousands of people in a very short time.
- **Cyber-attacks** are a threat to our water supply because the processes at industrial plants and water treatment facilities are now monitored and controlled by computers rather than done manually by humans. Supervisory control data acquisition (SCADA) systems are used to monitor and control water treatment plants and the

system ensures a smooth flow of the processes as long as everything is working correctly. The problem with SCADA is that it is vulnerable to hackers. This means that anyone that can gain unauthorized access to the water control system could potentially release a computer virus that could infect and shut down the entire system. The shutdown could leave millions of Americans with no water until the problem was corrected. Additionally, highly sensitive could be disclosed through the cyber-attack on the water system.

- **Detonation of dirty bombs** can be used by terrorists to release dangerous radiation into the water supply. According to the Center for Disease Control (CDC), the definition of a dirty bomb is "a mix of explosives, such as dynamite with radioactive powder or pellets. When the dynamite or other explosives are set off, the blast carries radioactive material into the surrounding area." Of course, bombs are dangerous and can cause destruction and the loss of lives when they explode, but a dirty bomb also releases *radioactive* materials upon detonation. Even though the radioactive material does not cause immediate illness to anyone except those who are very close to the explosion site, the radioactive dust from a dirty bomb can travel through the air for many miles. The radioactive dust may not be seen, smelled or tasted, but can be present and inhaled without a person even knowing that they have done so.
- A terrorist can target a water source or treatment facility and release radioactive material into the water supply or they can detonate a dirty bomb so that the radioactive material would inadvertently enter the country's water supply and drastically affect the health of those who drink the water.

Who Are the Terrorist that Could Attack the Water Supply?

On a consistent basis, the evening world news is filled with reports of severe terrorist attacks around the world. The United States is not an exception to the appalling consequences of these attacks. Anyone who believes the United States is not vulnerable to terrorism has not been paying attention to what is happening in this country! There are many groups and individuals who have the motivation to cause harm and death to the leaders and people of America.

Terrorists come in many forms, from the highly-developed Al-Qaeda organization responsible for the September 11, 2001, attack on the Twin Towers in New York to the lonely, angry man or woman who seeks revenge because of a perceived or an actual wrong that was done to them. To help you understand the terrorist, take a look at these four different types of terrorists:

- **The Lone Wolf**—Lone wolf terrorists are individuals that operate on their own and aren't associated with any specific terrorist group. Often, the lone wolf terrorist is mentally ill. It is also common for the lone wolf terrorist to be at odds with society or different sectors of society such as a certain political party, ethnic group, religion, or organization that stands for something they believe is wrong or harmful to society. The lone wolf terrorist is not simply a harmless mentally ill person. He or she is a person armed with the strength of their convictions and they can do great damage to individuals and

groups. Timothy McVeigh is an example of a lone wolf terrorist. He is responsible for the deadly terrorist act known as the Oklahoma City Bombing that killed 167 people and injured almost 700 more people. This horrible act of terrorism was carried out and innocent men, women, and children were killed and severely injured because McVeigh was angry with the United States government and wanted to get their attention. He wanted his message to be heard. It is not farfetched at all to think that someone who is angry at the government could and would contaminate or shut off the water supply to as many citizens as possible.

- **The Insider**—The insider terrorist is one who has the capability to carry out their plan because they have access to the data, information, security authorization, equipment, etc. needed for the plan. The insider may be an employee or former employee, a contractor, group member, security guard, information technology expert, or another individual who seems to be just an ordinary part of the company or organization. They know the system and how it works, what will allow them to access what they need, who is vulnerable, who they may be able to recruit, the best method for attacking, and the best time for an attack.
- There have been reports that members of known terrorist groups have applied and attempted to secure jobs at water treatment facilities. With access to America's water supply at the fingertips of water treatment facility employees, the country's water supply is vulnerable to insiders. It is no secret that terrorist organizations strategically partner with insiders to infiltrate specific landmarks and

necessary services and gain access to carry out their plan for destruction and death.

- **Cults, Anarchists, and Eco-Terrorists**—This category includes groups that are not associated with a particular country but are committed to a specific cause that they want to make people aware of in order to bring about change or to "punish" those who have not listened to them. The groups are usually very passionate and try to justify the destruction and death they cause when they "make their statements" by bombing buildings filled with people, holding hostages, destroying property, and killing innocent people. They will go to great lengths to make their points and try to negotiate for the changes they want to see happen.
- **State-Sponsored Terrorist Groups**—The state-sponsored terrorist groups are usually associated with groups that are known enemies of the United States. The groups usually consist of vast networks of members who have pledged an allegiance *against* the enemy. Significant financial and technical resources allow the groups to be well organized, powerful, and able to infiltrate the enemy's home turf. They are capable of launching large-scale attacks against their enemies. Al-Qaeda is an example of a state-sponsored terrorist group. It is known that the United States is the enemy of Al-Qaeda, that the group members have infiltrated many organizations in the United States, and it would be no surprise if members of the organization were involved in a massive attack on the water supply. Some have good reason to believe that it is only a matter of time before this happens.

The U.S. Water Supply and an EMP

Another major threat to the nation's water supply is an electromagnetic pulse or EMP. The term EMP may be a new one to you, but it is one that should be remembered. If you are serious about preparation to protect and provide for yourself and your family through any emergency, now is the time to prepare for an EMP, as this event can cause life as you know it in the United States to change drastically. Yes, in the event of an EMP, the water supply will be a major concern, but there will also be many other grave concerns. Again, now is the time to learn about EMP and the effect it can have on the United States.

What is an EMP?

In the report, "Electromagnetic Pulse: Thinking the Unthinkable" by Steven Scott Nolan, an EMP is defined as a high-intensity burst of electromagnetic radiation caused by an abrupt, rapid acceleration of charged electron particles. The burst causes catastrophic damage to electrical devices due to its impact on the electric and magnetic fields. In his report, Nolan explains that there are two causes of EMPs: coronal mass ejection or the detonation of a nuclear bomb.

Coronal Mass Ejection or Solar Storms

A naturally-occurring phenomenon called a coronal mass ejection (CME), which is known in laymen terms as a solar storm can cause an EMP. According to Nolan, solar storms or CMEs are "huge bubbles of gas that are threaded with magnetic field lines, which are routinely ejected from the sun. At a minimum, there is an average of one CME weekly. During some cycles of more violent activity on the sun, there is an average of two or three CMEs per day.

Most CMEs that occur daily or even more often are not noticeable by most people, but major CMEs have the potential to do tremendous damage to the world's electrical grid. As an example, in March 1989, a solar storm knocked out the Hydro-Quebec Power Grid that shut off electricity for over six million Canadians. This CME occurred during a "solar minimum" period, which is the point in the sun's eleven-year sunspot cycle when there is supposed to be little or no solar activity. Had the CME been more intense such as during the "solar maximum," the point in the sunspot cycle where

the most violent solar activity occurs, the severity and devastation could have been far greater.

According to Nolan, such intense CMEs have already occurred. Nolan states that "In the last 150 years, there have been two solar flares of such powerful magnitude that if one were to occur today it would essentially destroy our entire electrical grid. If one of these events occurred today, it could take years to recover from—if we could recover from it at all."

On September 1, 1859, the most severe weather-related EMP in recorded history happened. The event, known as the "Carrington Event" is named in honor of the English solar astronomer Richard Carrington who first saw the intense white light in the sky that preceded the subsequent geomagnetic storm. The Carrington Event lit the skies all over the earth with red, green, and purple auroras as bright as daylight. The event also caused the earth to shake and the electronic devices of that time period to go haywire as it sent currents through telegraph wires and ignited the telegraph paper. Several buildings also burned during the EMP.

During the Carrington Event, people were not dependent on electricity and electronic devices the same as they are today. Nolan makes the observation that "Another Carrington-class flare hitting today would dwarf (the 1859 EMP) effects due to our microprocessor dependencies and vulnerabilities."

Most young people in the U.S. today cannot even imagine a life without cell phones, but it goes well beyond that. Commerce in the United States is completely dependent on the latest technology. The U.S. is dependent on said technology for mass transportation, electricity, communication, and even the food and water supply. Even the shutting down of GPS would cause tremendous chaos as GPS is involved in most everything people do

from transportation of food to financial transactions. Every time you use your debit or credit card, it goes through a GPS satellite. Without the functioning GPS, you could not use the card or access your cash from your bank. Most cars are dependent on computers today, so most people would no longer have transportation. An EMP could also quite likely shut down the nation's water supply system without prior warning!

Scientists conduct research on solar storms and try to estimate when the next time of intense solar activity may occur. This is of concern for obvious reasons, but one of the major concerns is that the development of an unprecedentedly large hole in the earth's geomagnetic shield leaves the earth extremely vulnerable to solar flare damage. Weather experts predict that a blackout from a massive EMP could be widespread and long-lasting, leaving the country without power for maybe an entire year or so and without fully restored power and order for between four and ten years. You can only imagine the conditions this would create in our society today!

Detonation of Nuclear Bomb

Besides being caused by solar storms, EMPs can also be caused by the detonation of a nuclear bomb high above the earth's atmosphere. This is referred to as HEMP or high-altitude EMP. A HEMP would create the same kind of destruction as an EMP caused by a solar storm but the outcome would probably be far more catastrophic because the nuclear blast would be closer to the earth's surface and there would be fallout. With the current state of worldwide affairs and the progression of nuclear technology among the known enemies of the United States, some believe a HEMP strike is inevitable. North Korea, China, Iran, and Russia are believed to have weapons that could create a tremendously huge HEMP event in the United

States. In fact, according to Nolan's report, Dr. Peter Vincent Pry, a former CIA nuclear weapons analyst said that a round of tests conducted by North Korea in May 2009 included a "…super-EMP weapon capable of emitting enough gamma rays to disable the electric power grid across most of the lower 48 states."

What happens when a nuclear bomb is detonated in the atmosphere above the earth? It releases a powerful wave of gamma rays that hit the upper atmosphere and creates an electrical commotion known as the Compton Effect. The electromagnetic pulse travels at the speed of light to the earth's surface. You might think this would be a roaring sound and the effect would be tall buildings crashing and humans falling dead, but that is not the case. The electromagnetic pulse is not seen or heard as it travels to earth and it does not directly cause harm to humans. However, it is deadly for all microprocessors on the earth!

An EMP could destroy much of the United States' infrastructure and this also means the country's water system infrastructure. The water supply is extremely vulnerable to an EMP strike. Modern community water production and distribution relies heavily on electricity for electrically driven pumps, valves, filters, and much more. Electricity is also critical for treating water to make it safe and for delivering it to homes and businesses throughout the United States. In the event of an EMP strike and the resulting blackout, the country's water system would shut down. Also, cars and trucks would be disabled during an EMP strike, so there would not be transportation for hauling water or getting to a place to buy water for those who do not live within walking distance of a store. Even then, the store shelves would be instantly emptied of any available water. In a very short

time, there would be no water available for millions of U.S. citizens who are not prepared for an EMP and the resulting destruction.

In his report, Nolan says that a water shortage caused by an EMP event could cause the rapid deterioration of our society. He paints a dismal picture with this statement, “The EMP Commission concluded that a prolonged water shortage might quickly lead to serious consequences. People preoccupied with finding or producing enough drinking water to sustain life would be unavailable to work at normal jobs; most industrial processes require large quantities of water and would cease; demoralization and the eventual deterioration of social order can be expected if a shortage is protracted, and anarchy will certainly loom if government cannot supply the population with enough water to preserve health and life.”

Yes, that paints a very dismal picture of what life could be like after an EMP strike for those who are prepared to provide their own water. Fortunately, YOU can prepare so that you are not so vulnerable to the fragility and fallibility of the country’s water system. Continue on to the next unit to learn how you can start to prepare now for a water emergency so you are not caught off-guard.

Storing Water for a Water Crisis

As you have read in previous chapters of this guide, there are a number of factors that render the United States water supply vulnerable to contamination, shortage, and shutdown. As you can probably see, with so many pressing factors such as failing water infrastructure, drought, wind and ice storms, solar storms, terrorism, and EMPs threatening the water supply, it would be miraculous if there were no shortage or shutdown that could bring our country to a screeching halt! No matter what actually launches a severe water shortage or the shutdown of the water system, most experts agree that it is inevitable. No one knows exactly when it could happen, but most believe it *will* happen, and their guess is that it could be from now to any time in the *near* future. If you still doubt that it will happen, consider the following:

- The U.S. has extreme enemies that have developed technology that makes it possible for them to launch a HEMP attack over the U.S.
- Natural disasters such as hurricanes, earthquakes, severe winter storms, drought, tornadoes, and flooding can disrupt the water service, and these things seem to be happening more frequently around the world.
- The water supply often contains chemicals that are unsafe for human consumption, and that is leading to a society that is unhealthy and disease ridden.
- The demands on the water supply are increasing.
- The aged water infrastructure is quickly decaying.

- On average, 850 water main breaks happen in the United States every day making the water supply vulnerable to contamination and creating further water shortage.
- The people of the United States live in a time when terrorism attacks are rampant around the world and in the United States. Our water supply is vulnerable to terrorists who could use the water supply to kill millions of people quickly.

It has been established that there are many triggers for a water crisis. Whatever events cause the water crisis, the most important thing is for you to be prepared so that you are not caught off guard without water to sustain you and your family through the crisis. Most Americans are not prepared. If they were to go to the kitchen faucet to get a glass of tap water and water doesn't come from the faucet when they turn it on, they would simply be without water. They do not have water stored and do not know where to get water if the community water supply is off and the store shelves are emptied of bottled water.

You know that you cannot rely on the government to come to your rescue during a time of crisis. In events, such as the Hurricane Katrina scenario, people who depended on the government to provide drinking water for them were literally left high and dry. Don't allow this to happen to you and your family. Take the initiative now, while you still can, to prepare for the water crisis that is sure to come. Even if the crisis does not come in your lifetime, by preparing now, you are teaching your children and young family members to prepare and remain prepared for the inevitable water crisis.

How do you prepare? In the following sections of this guide, you will learn critical information for storing, sourcing, collecting, treating, and conserving water—everything you need to know for increasing your chances of surviving a water crisis.

Store Water

The first and probably the easiest step that you can take to prepare for a water crisis is to store clean, safe water that can be used when your usual source of water is contaminated or not available. Today, since water runs from your tap, you may think storing water is an unnecessary, time-consuming, expensive task that you would rather not do. You may be in denial, thinking that if your tap water does not flow you can simply go to the neighborhood grocery store and stock up on bottled water.

Or you may think that the American Red Cross or a government organization will provide water for you. It's important to keep in mind that millions of other people across the nation are probably thinking the same thing. Even if you make a mad dash to the grocery store when you realize there is no tap water, the shelves will likely have been emptied by the store employees and others who were already at the store when the crisis hit. Also, there will always be those opportunists who go into the stores and purchase all the water they can to resell it. There will not be enough supply to meet the demand. You should not count on being able to run out and buy bottled water once a crisis hits. It makes much more sense to prepare ahead of time so you *know* that you have plenty of safe drinking water.

How Much Water Should You Store?

There is no exact number for how much water you should store for a water crisis because you do not know how long the crisis may last. You do not know if the crisis will happen during hot summer months or cold winter months, which can affect how much water you may need. But as a good rule of thumb, you should plan on storing one gallon of drinking water per day per person. Additionally, one quart of drinking water per *small* pet, such as a cat, should be stored. If you have a large dog or pet, you should store one gallon of water per day for it. Take into consideration the following special needs if they are applicable to you or family members:

- Nursing women will need to drink more water.
- If you live in an extremely hot climate, every person in your family will need more water.
- If you or a family member is dependent on water for medical care or to operate medical equipment, you must prepare for that.

- If you have livestock or chickens and small farm animals that you will depend on for food, eggs, and dairy products, additional water will be needed to keep the animals healthy.
- During times of extreme activity such as hiking or biking, which may be necessary during an EMP event, you will perspire more and need to drink more water than usual.
- People who are ill may require more water than usual to sustain their medical requirements.
- Your water needs may be greater if you depend entirely on water for hydration rather than including other drinks. (Do not count on sugary drinks such as soda for hydration!)

You do not know how long a water crisis will last, but you should be prepared for it to last no less than three days, meaning you should store no less than three gallons of water for each person in your family. A three-day supply of water may get you through the most critical time of the crisis, but if you've ever had to wait for utility services to be restored after a storm, you understand that three days can come and go without service being restored. Most of the water utility companies in the United States serve thousands or even hundreds of thousands of customers. In any major crisis, it will most certainly take the companies more than three days to restore water service. For peace of mind, it would be wise to store at least two weeks' worth of water. This would be 14 gallons per family member. Yes, that is a lot of water, but it is better to be safe than sorry.

Where Should You Store the Water?

It is best to store water in a cool, darker place to help prohibit the growth of algae due to heat and light. Good examples of cool, dark places could include the following:

- Basement
- Root cellar
- Garage
- Fallout shelter
- Dark closet
- Dark pantry
- Outbuilding that is shaded by trees or covered windows to keep out direct sunlight
- Under staircases
- Under beds

Depending on your living space, get creative with where you can stuff water containers that are clearly marked as drinking water. When choosing a space to store your water, keep in mind that the more private the area is, the better. Advertising that you have clean, safe drinking water stored can jeopardize your safety and the safety of your family if the nation's water supply is suddenly nonexistent.

Types of Storage Containers for Water

Barrels—Barrels can be purchased in various sizes ranging from five gallons to fifty-five gallons. The advantage of barrels is that a lot of water can be stored for a long period if the water or barrel is not contaminated with bacteria when the barrel is filled. Because of the large amount of water

that is stored in one 55-gallon barrel, precaution must be taken to ensure that algae do not grow in the water. One preventive measure is to purchase barrels that are made from a material that helps deter algae growth in the water. If you purchase barrels with spigots on them, retrieving the water from the barrel will be much simpler and there will be less waste if the spigot is turned off correctly after each use. You can also easily install your own spigot in the barrel if one is not pre-installed.

Barrels can be stacked two high and still be accessible for use, but they still take up a lot of floor space in a storage area. If you do not have a large storage area, barrels may not be a practical option for you.

The main downside of using barrels is that they are not portable. You cannot simply grab one if you must leave your home during an emergency. If you use barrels for water storage, make sure you also have a portable, transportable source of water.

Boxed Water Storage—Boxed water storage kits consist of a five-gallon Mylar pouch that is filled with water and stored inside a cardboard box. There are several advantages to boxed water storage:

- The boxes protect the water pouches from exposure to sunlight, which helps prevent algae growth.
- The boxes also help protect the pouch from accidental punctures.
- The boxes are stackable and take up minimum floor space in the storage area.
- The boxes can be easily stored underneath a bed.
- The five-gallon cartons are fairly portable and easy to transport in the event that you needed to grab a few for the car during an emergency.
- The Mylar pouches are durable and correctly sealed.

Pre-filled Pouches—Prefilled pouches contain four ounces of drinking water and are ideal for storing individual servings of water in emergency bugout bags. Even young children can manage to carry a few of the light-weight pre-filled pouches. However, the pre-filled pouches are not the most economical source of water for long-term use and are probably best reserved for when water is needed "on the go" during an emergency.

Pre-Packaged Water—Packaged water includes bottled water, gallon jugs of water, water in small boxes, and cans of water. While it is very convenient because you simply buy it and store it, pre-packaged water is not economical. It is considerably less expensive to buy containers and store your own tap water. Nonetheless, if you have more money than time available to prepare for a water crisis, by all means, pre-packaged water is significantly better than not storing any water because you feel you do not have the time to invest in sanitizing containers, filling containers, and treating the water with chlorine. Even if you do not choose pre-packaged water as your main, long-term water source, it can come in handy in an instance where other water sources fail. So, it doesn't hurt to pick up a case or two of 16-ounce bottles of water every time they go on sale at your local supermarket.

If you use prepackaged water, keep in mind that the plastic water bottles and jugs let in light. This means you will need to rotate the containers more frequently than you would water stored in barrels or other containers that keep out light. It is recommended that water contained in plastic jugs and bottles is rotated with fresh water about every six months. For this reason, water in cans may be a better option. Cans of water have a long shelf life of up to 30 years, and the cans may be sturdier and less likely to leak. Canned

water withstands extreme temperatures better than water in plastic bottles or jugs. Disadvantages of canned water are the cost and availability. In the United States, canned water is not as prominent on the grocery store shelves as it is in some countries. If you are interested in purchasing canned water, check for a source online. Many companies that sell survival gear stock canned water.

Food/Water Safe Containers—There are numerous safe containers that you can fill with tap water for storage. Using containers that you already have can save you money and help you feel good about reusing what you have already paid for. The main caution is to make sure the container is food grade material and is sterilized before filling. For long-term storage, it's best to avoid containers that are clear plastic, but the clear plastic is fine for short-term storage or for storing water to use for cleaning, flushing the toilet, washing dishes, etc. Water-safe containers that you may already have at home may include the following:

- Plastic or glass gallon jars such as the ones that mayonnaise, mustard, or pickles come in for restaurants, cleaned well and aired out to rid of smell
- Quart-size or larger canning jars (If the risk of breakage is not too high.)
- 2-liter soda bottles
- Glass or plastic quart, half-gallon, or gallon juice containers
- Large food-grade bins, such as the ones for cereal storage (think Tupperware)
- 5-gallon tubs that restaurant foods come in

- 1-gallon or 5-gallon plastic camping water containers with a spigot on it

There are some containers that are not suitable for storing water. Here is a list of containers that you should not use to store water:

- Milk jugs—The protein and fat in milk can leave behind a residue that is extremely difficult to completely remove from plastic milk cartons. This creates the risk of bacterial growth that can make the water unsafe and unfit to drink.
- Non-food, non-water grade containers—If you are not certain that the container is made from food-grade material, it is best not to use it and risk plastics or other toxins from entering the water. This includes 55-gallon barrels, large bins, and buckets.
- Toxic substances containers—Toxic chemicals and cleaning supplies often come in five-gallon buckets or gallon jugs. Again, no matter how carefully you wash the container, the container may have absorbed the toxins and they will be released into the water.
- Chlorine bleach bottles—It may seem as though food-grade plastic chlorine bleach bottles would be a good choice for storing water, but they are not. These bottles or jugs contain an anti-static agent that prevents the accumulation of dust during storage.
- Old glass jars—At first thought, the really old canning gallon and quart-sized jars that have been stored in Great-Grandma's attic for years may seem like the perfect water storage containers. Think again! Really old glass jars contain lead. Unacceptable amounts of lead can leach into the stored water in a short amount of time.

- Breakable containers—Modern glass does not contain lead and can be sanitized/sterilized so that it is very safe for water storage. In many instances, glass containers are excellent for storing water. Glass containers are not ideal if there is a high probability that the glass containers will get broken. The risk of broken glass may be dependent on the combination of where you store the containers, the climate you live in, and who will be handling the containers. For an example, if you live in an area with freezing temperatures in the winter time and you must store your water in the garage or outbuilding on the property that is not heated, the water could freeze and the containers could crack as the water expands. If you must store the water in an area of your home that gets high traffic, the chances that the glass containers will get broken increases. Accidents happen!
- Flimsy containers—Any containers that will deteriorate quickly or can easily be damaged should not be used. Cardboard containers, unless they are heavily coated with a waterproof food-safe material, are an example of a flimsy container that should not be used. It is better to buy new containers than to risk losing your saved water because of leaky or disintegrated containers.

Storage Tips

When the nation's water supply runs out, is shut down, or is no longer safe for drinking, water will be a valuable commodity. It will be like gold because people cannot survive without it. It is best to grasp that mental picture when you prepare your water for storage, as holding onto that

picture in your mind will help you proceed with caution. Your very survival could one day depend on the way you prepare the water for storage. Here are some tips for storing water from the American Red Cross and the Federal Emergency Management Agency (FEMA):

- Recycled containers should be washed thoroughly with dishwashing soap and hot water. Rinse thoroughly so no soap residue is left behind. Containers that held liquids other than water should also be sanitized before filling. To sanitize, make a solution of one teaspoon of non-scented chlorine bleach added to one quart of clean water. Use this solution to thoroughly rinse the container, making sure the solution touches all surfaces of the container, then rinse the container and place on clean paper towels to dry or dry with a clean dish towel.
- If you are storing water from a community water supply where chlorine bleach is added to the water, you do not need to treat the water after you fill the container. However, if you are storing water from a well or other source that is not treated with chlorine bleach, you should add two drops of chlorine bleach to each gallon of stored water.
- When you reuse containers for storing water, always use the original cap or lid for the container to ensure that it fits snugly and correctly. When putting the cap on the container, do not touch the inside of the cap as your fingers may leave behind bacteria.
- Label the outside of each water container with the date the container was filled and “drinking water” so that it is not mistaken for water that is meant for cleaning, etc.
- Rotate the stored water every six months.

A section on water storage would not be complete without mentioning plastic containers that contain Bisphenol A, or as it is commonly known, BPA. BPA is a chemical compound that is commonly used in the manufacturing of plastic products. The compound can be found in plastic containers. While longevity may not be your greatest concern when you are storing emergency water, your health should be a concern. In the event of a major emergency, you will need every bit of your strength to function and survive. Medical care may not be available to you, so you want to stay well. (Start working on optimum health *now*!) Some believe that BPA is linked to serious diseases such as cancer. Therefore, if possible, make sure the containers that you use for storing water do not contain BPA.

Storing Water in Your Vehicle

Of course, you must have your home well-stocked with water for surviving a water crisis, but what would happen if you were miles from home in your car when a national or regional emergency happens? Ideally, you would be able to get home, but that might not be the case. There are several emergency scenarios such as flooding or an EMP strike that could cause road blocks and traffic jams and keep you from getting home. If you are in your car when an emergency happens, it could take you several days to get home. In that event, you would need water to survive right where you were stranded. Even the most impressive water supply at home would not help you survive if you are not at home. Therefore, it's important for each car that you and family members drive to have a water supply. Additionally, if you carry a purse, backpack, or briefcase, always keep a bottle of water in it. Taking that little precaution could literally save your life!

The best type of water to store in the car is individual sized containers made from a material that will not allow in light. The containers should be sturdy and not breakable.

Covering all of your bases with safe water storage is one of, if not *the single most*, important thing that you can do to prepare for any emergency. Your body can survive for several days with little or no food if it's necessary, and besides, the chances of finding enough food to survive an emergency period are more likely than finding enough water if all water is shut off or contaminated. Most people have a few snacks and protein bars stashed here and there in their purse, briefcase, or glove compartment, and you can forage, fish, or hunt for food if you live in a natural environment. (By the way, if you do not have a few protein bars stashed in your car, purse, etc., think about developing the habit of always having a little food and a bottle of water with you at all times, as you never know when an emergency will happen. Take on the Boy Scout motto and always be prepared!) Many people have backyard chickens or other animals to help provide food. But water could be extremely scarce during an emergency. Your body can only survive a few days without water, so make storing water a priority as you prepare to survive an emergency.

Sourcing Water

If there is a water crisis, there is no way to know how long you will be without your usual source of water. In some emergency scenarios, the water crisis could last only a couple of days or a couple of weeks, but in other scenarios, you could be without water for several months or a few years. While that may seem far-fetched, if the entire infrastructure of the water supply crumbles, it could take years to rebuild. If a HEMP strike shut down the water system, it could take a year or more for the systems to be repaired. As troubling as it is to think about it, if there were a major terrorist attack and the majority of the aquifers and other water sources were poisoned, the cleanup would take months, if not years.

Though not impossible to do, it would be difficult and costly for most people to store enough water to last for a year or more. It is not feasible for most people to have space and the funds to purchase and fill gigantic personal water tanks. That means you must be able to have water instantly at the onset of an emergency and be able to find water to use for the duration of a lengthy emergency situation.

Water may be found in unexpected places both in your home and in nature. In this unit, you will learn where to look for water when your normal water source is gone or contaminated.

Natural Sources of Water

Fortunately, when man-made water sources are no longer available to you due to natural disasters, terrorism, or a myriad of other reasons, there are natural water sources that you may be able to depend on. During a water crisis, you may be able to find enough natural water sources to sustain yourself and your family. You just need to know *ahead of time* what your options are. Here is a list of natural water sources that you may be able to take advantage of:

- Creeks and streams
- Rivers
- Canals
- Ponds
- Lakes
- Natural springs
- Collected precipitation in the form of rain and snow

If you happen to have a pond on your property, your water source is a no-brainer! If you don't have a pond on your property but it is feasible to put in a lined one, it may be a good idea to consider doing so. You are also very fortunate if you live in an area where there is a nearby creek, stream, or river. But if not, you will need to seek out a natural water source that you and your family can get to on foot or bicycle if necessary. (Remember if there is a HEMP disaster, your vehicles may not be drivable unless you have purchased an older vehicle and intentionally prepared for it to operate in the event of a HEMP strike.) When you seek out a natural water source, you

must consider whether the source will be usable during all four seasons of the year or if it will freeze during harsh winter weather or dry up during scorching hot summer months.

Water from most natural sources is drinkable *if the water is treated before drinking*, but that is not always the case. In some instances, the water may be so polluted that it is not drinkable without industrial type treatment. Therefore, one of your greatest considerations about the water source should be whether the water is treatable and what the best treatment method would be. Even water that appears to be pure and pristine, such as water that flows from mountain snow, may contain dangerous microorganisms or bacteria from dead animals or even human waste. All naturally-sourced water must be treated to some degree before drinking it. You may need to do some detective work to determine where the water comes from. Is it rain water? Does it come from snowpack in the mountains? You should avoid collecting water that is darkly colored, has an

odor, or contains debris. Do not count on water treatment to protect against obviously contaminated water.

Water in Your Home

You may not have thought about it, but you may have hidden water in your home that can be used in the event of an emergency. If you know about these hidden water sources *before* your emergency strikes, you can quickly access the water to help you and your family survive. If you hear of an emergency that could create a water crisis, you should instantly go to the water shut-off valve to your home and shut off all incoming water so that contaminated water cannot enter the plumbing of your home. This is particularly important if there are broken water mains or sewage lines in your community.

If you fail to shut out contaminated water and it enters the plumbing in your home, do not use the contaminated water in your home. An example of contaminated water would be flood water that enters your home by flowing in from outdoors or coming up through a basement drain or toilet. Floodwater can be highly contaminated with oils, industrial chemicals, hazardous wastes, and toxins. Even after treatment, it is not safe for drinking, washing dishes, or bathing. However, this water can be used to flush the toilet as long as precaution is taken that the water does not come into contact with the skin or splashed in your face.

Hot Water Heater

One of the best hidden water sources is your hot water heater. On average, hot water heaters hold 50 gallons or more of water. In an emergency, when

there is no water to be found, that water is very valuable! To gain access to the water in your hot water heater, follow these steps:

- Unplug the hot water heater unit or turn off the gas at the intake valve, or turn off the electricity at the circuit breaker.
- Place a clean bucket or another container under the drain at the bottom of the hot water heater tank to collect the water. (The drain on most hot water heaters resembles an outside water faucet with a knob to turn it on and off.) Before the drain is turned on, remind yourself that the water coming from the hot water tank may be scalding hot. Take care not to let the water splash on you or overflow from the container.
- Turn off the water intake valve, which is usually located above the water heater.
- Turn on a hot water faucet at one of the sinks in the house. This will provide a vent that allows the water to flow from the tank. (Remember not to turn the gas or electricity to the hot water heater back on until after the water at the main water supply valve and water intake valve of the hot water tank are turned back on and the hot water tank is filled with water.)
- Treat the water that you collect from the water tank *before* drinking. Once the water is treated, it should be safe for drinking.

Water Pipes

At any given time, there is water in the plumbing of your house. If there is no water pressure, the water can be collected and treated for drinking. Follow these steps to collect water from the pipes in your home:

- Turn on a faucet at the highest level in your house to let the air into the plumbing. As an example, turn on the shower faucet in the bathroom. Water won't come out of the faucet because there is no water pressure.
- Now, go to the lowest level faucet on the house, which is likely to be an outdoor faucet, and place a clean bucket or container under the faucet to collect the water. Turn on the faucet.
- The water is drinkable from the faucet as long as it has not been sitting in the pipes for a week or more. If you are not sure about the length of time the water has been in the pipes, it is best to err on the side of safety and treat it with chlorine bleach before drinking.

Toilet

You may collect water from the toilet tank and then treat it for drinking. However, it is never safe to collect and drink water from the toilet bowl. There are too many germs that can make you very sick in the toilet bowl.

Hot Tubs and Swimming Pools

If you have a swimming pool or hot tub on your property, you may have a source of useable water in the event of an emergency. Swimming pools are not the best source of drinking water, but you can take a few steps that will make the water usable for survival through a water crisis. Here are some tips for keeping your pool ready for usable water during an emergency:

- Keep the pool treated with the safest type of treatment so that the water does not develop harmful microorganisms.
- Keep the pool covered when not in use to keep contaminants out of the water. Make sure the cover is also kept clean when in use and

when in storage so bacteria do not grow on the cover and get into the water.

Water Beds

If you have a water bed, you know the enormous amount of water that the mattress holds—in most cases up to around 400 gallons, depending on the size of the mattress. Again, just like with the swimming pool or hot tub, water bed water is not ideal for drinking water but the water could also turn out to be a lifesaver if the proper steps are taken to maintain the water bed as a potential emergency source of water. Here are tips for maintaining the water bed emergency water source:

- Drain the bed once a year and refill with fresh, clean water.
- Treat the fresh water with chlorine bleach to keep bacteria at bay. The correct formula for treatment is to add ¼ cup (2 ounces) of unscented chlorine bleach per every 120 gallons of water.
- Do not add algaecides or other chemical treatments to the water, even if the waterbed manufacturer instructions say to do so.
- Boil the water from the waterbed before drinking or using to cook, clean, or bathe.

Rainwater

If you live in an area of the country where it rains frequently, you may be able to collect enough rain water to survive a water crisis during the rainy season. It is not difficult to make a simple rainwater collection system ahead of time or they can be purchased at some retail stores that sell survival or homesteading gear, but if you get caught without one, you can

simply collect rainwater in whatever clean containers you have available. Rainwater is natural, but it must be treated or boiled before using.

Miscellaneous Emergency Water in Your Home

If you get caught off-guard with no water source, check your refrigerator and pantry for the possibility of water to help you survive. In your pantry, you may have canned vegetables or canned tuna fish packed in water. While this water certainly isn't optimum for drinking and hydration, it may be just enough liquid to keep you from dehydrating.

While checking out the pantry and refrigerator, check for cans or cartons of broth, which are mostly liquid. Also, check for coconut water that comes in cans or cartons and bottles of sports drinks or natural teas that do not contain a lot of sugar. (Sugary drinks can contribute to dehydration.) Look for green vegetables such as celery that contain water. Are there any ice cubes in the freezer?

There may be a little water left in outside water hoses from the last time they were used. This water is drinkable if treated.

You may have water in clean spray bottles around the house that could be used for drinking or for cleaning. Just make sure that you know the bottles were clean and did not contain any chemicals when filled and did not have any chemicals added later.

There are many sources of water hidden around your house that you probably do not think about. Take some time to go around your house today and see how much hidden water you can find. Think about how you might treat the water to make it drinkable or at least usable for non-drinking purposes.

What You Should NOT Drink

There are some liquids that you should *not* drink even in an emergency. It has already been discussed that you should never drink water from the toilet bowl, and only drink water from the toilet tank after it has been treated. Add these undrinkable water sources to your DO NOT DRINK list, and make sure your children and family members understand that these are not drinkable water sources:

- Drinking urine is a hot topic that survivalist often debate. Urine is about 95% water, and there are documented cases where people have drunk their own urine to survive when there was no other water source. However, most experts say that drinking your urine is not advisable. Even the U.S. Army specifically lists urine on their "do not drink" list in The Army Field Manual.
- Besides the fact that it would be extremely difficult for most to drink urine, urine contains waste products that the kidneys flush out of the body. When you drink the urine, you put the waste right back into your body and you soon have a highly- concentrated amount of waste in the body. Your kidneys cannot handle waste in this highly-concentrated form and it can cause you to have symptoms similar to those of total kidney failure. The severe symptoms would cause you to feel very sick and unable to function, at best.
- If you were dehydrated and knew that if your body did not get water soon, you would die, drinking urine could be an option, so saving your urine for that extreme situation would be a good idea. But you should not depend on urine as a viable water source.

- Sewer pipe water should not be considered a water source for any reason. Even if you boil the water, the risk of becoming extremely ill or dying from drinking sewer water is too great.
- Do not drink water from polluted rivers, canals, streams, or lakes without first treating it, even if the only treatment is boiling it.
- Never drink water from the radiator of an old vehicle (new cars do not have radiators).
- Never drink liquid chemicals. It may seem that this could go without saying, but in extreme emergencies, it can be difficult to think clearly.

Carefully think about your water source plan so that it is automatic when you need to implement it. The more options you have in an emergency, the better your chances of survival. Be creative and prepare!

Treating Water

In the previous unit, you learned of several sources for water in nature and in your home. You also learned that most of these water sources require treatment in order to protect yourself and your family from waterborne illness when the water is used for drinking, cooking, and bathing. The body's immune system is no match for some of the microorganisms found in some of the water sources. It's important that the microorganisms do not enter your body through the mouth (drinking, eating food on dishes washed in the water, brushing teeth, etc.) or the skin (bathing, washing hands, etc.). In this unit, you will learn how to best treat whatever water source you have available to make it useable.

Filtration and Purification

When it comes to treating water, the terms filtration and purification are often used interchangeably, however, filtration and purification are actually two different processes. Filtration is the process of straining water so that the water and impurities such as dirt, debris, and sand are separated. Purification is the process of removing disease-causing microorganisms from the water. Filtration clears the water of larger items but cannot necessarily remove the minuscule microorganisms from the water unless the filtration system is highly sophisticated and designed to do so with special filters. In some instances, both filtration and purification are required to make water safe to drink.

In the event of a water crisis when you are dependent on being able to use whatever water you can find, you need to be familiar with filtration and purification methods. Knowing how to correctly filter and purify water could be a life-saving survival technique. Don't put off learning filtration and purification methods until you are tested on the subject in an emergency situation. Become familiar with the methods now so that when the time comes that they are needed, you are prepared with the proper equipment and can easily go through the process to provide safe drinking water for yourself and your family.

Water Filtration Methods

When it comes to water filtration methods, you have several options that include do-it-yourself homemade systems and purchased filtration systems. Think about your water sources, living situation, location, and how much water you will need to filtrate and choose the best method for your specific needs. If you have more time on your hands than money, you can save money by building your own system. But if you don't have much time away from work and other responsibilities, you may be better off to purchase a system. Either way, the key is to prepare ahead of time.

Reverse Osmosis

With the reverse osmosis filtration system, pressure is applied, which forces the natural flow of the water to be reversed. The water then flows through a membrane, leaving behind larger, denser materials such as salt molecules. You can see why this type of filtration system is often used for sea water that would be undrinkable without having the salt removed, but reverse osmosis is also an effective method for removing bacteria and other organisms that cause disease.

Reverse osmosis is a common and preferred method for filtration for ordinary daily use, but it does have some drawbacks. The main drawback is that the reverse osmosis filters can leave some chemicals and chlorine in the water. Another drawback is that strong water pressure is needed in order to produce clean water. In a water emergency, there may not be any water pressure, let alone strong water pressure. Also, reverse osmosis

filtration yields a very slow flow rate that does not make it ideal for survival situations when every minute can count.

Ion Exchange

The ion exchange methods filter water by exchanging poisonous and heavy metal ions in water for less harmful ones such as sodium and potassium. The two most common ion exchange methods are softening and deionization. The main purpose of softening is to pretreat hard water before using reverse osmosis for further processing. Deionization removes harmful ions from water, but deionization does not effectively remove most microorganisms. In fact, it is known that microorganisms can actually attach to deionization resins and create a breeding ground for harmful bacteria. Deionization works best if it is used with other filtration methods such as carbon absorption or reverse osmosis.

Carbon Absorption

The strength of the carbon absorption filtration process is that it effectively removes chlorine from water. It also removes sediment and organic compounds. It is effective for protecting other filtration system components from chlorine, which makes it a good method for using in combination with other systems.

The main downside of carbon absorption systems is that the filters need to be replaced regularly or they are not effective. While this is not usually a problem, it is possible that replacement filters would not be available during a water crisis situation. If you plan to depend on carbon absorption as part of your water filtering program, you should purchase and store dozens of filters for your system.

Ultra-Filtration and Specialty Filters

Ultra-filtration is a method that uses an infinitesimally fine filter to remove particles that are larger in size than the filter's rated size. Ultra-filtration effectively removes most particles, microorganisms, pyrogens, and colloids, leaving high-quality, clean, safe water.

There are also several specialty filters on the market that are highly specialized and designed to remove specific contaminants from water.

Choosing a filter can be a difficult decision. You want to get the best for your money and get one that you know you can count on for pure, safe water if needed in an emergency. You must find a filter that fits within your budget, and yet, one that can hold up and remain effective with rigorous use over a long period of time. You must also consider the fact that electricity and water pressure may be non-existent during a water crisis. All of that is a lot to ask of one single filter! To help you out, here are a few filters to consider. This is not an endorsement of any particular filter, but information gathered from reviews, feedback, and filter information sheets.

- Frontier Water Filter Straw—This is a great little on-the-go water filter and is a good choice for keeping in your emergency backpack, bugout bag, or car. It is ultra-lightweight and portable. It filters out contaminants down to two microns in size, including worrisome giardia and cryptosporidium. The versatile filter allows you to drink safely from any bottle or cup or directly from the water source. This filter is not meant for large-scale water filtration or long-term use and is not intended to serve a family. It is an individual filter and can filter about 20 gallons of water before it needs to be replaced.

- CB-22R Clearbrook Portable Water Filter—This high-performance portable filter has been used in disaster relief situations worldwide. The University of Arizona tested and confirmed that the filter successfully reduces cryptosporidium, giardia, E-Coli, chlorine, lead, heavy metals, chemicals, sediment, silt, sand, bad tastes, and odors. The inexpensive filter can be used about 500 times before needing to be replaced.
- Exstream Virustat Kit—This kit uses a cyst filter and a carbon prefilter to remove impurities from sourced water and it does not require power or batteries to operate, making it a great on-the-go filter. The only drawback is the same one that pertains to most filters—parts must be replaced for the filter to continue to work effectively. In this case, keep in mind that the filter, prefilter, and cartridge must be replaced. If you choose this filter for your emergency kit, be sure to have several of both filters and plenty of cartridges stored with the kit.
- Reliance Products PUR Clean Drinking Water Kit—This water treatment kit is a blend of filtration and purification components that provides clean, safe drinking water in an emergency situation. The kit consists of a collapsible mixing container, collapsible water storage container, filtering cloth, stir stick, cutters for opening the purifier packets, and three PUR purifier packets. The system is quick for producing safe drinking water, taking only 30 minutes to process from start to finish. The kit filters and purifies a total of 7.5 gallons of water (2.5 gallons per one of the three purifier packets), meaning it is not suitable for economical long-term use.

- Berkey Water Systems—Berkey Water Systems do not require power to work, making them a great system for emergency water. Berkey filters use gravity to filter water and provide water that is free of fluoride, pathogens, bacteria, cysts, chemicals, pesticides, herbicides, odors, and foul tastes. The filter also reduces heavy metals but does not remove the minerals that your body needs.

Some other good options to consider for water filtration in an emergency situation are the following filters:

- Aquamira Frontier Pro by McNett
- Aquamira Frontier Emergency Water Filter
- Steripen Emergency Water Purification System
- Katadyn Gravidyn and Ceradyn Drip System
- Katadyn Combi Counter-Top and Bottle Filter

An Impromptu Filter

When you source water from nature or a questionable source, filtration is an important step on the journey to life-sustaining water. Choose your filtration system carefully and test it before you are in a position of having to depend on it for survival.

Now, that said, you should also be prepared to filter your water if your filtration system fails. When you are working with this type of equipment things *can* and *do* go terribly wrong at times. If you have had the good fortune to talk to many hikers, the kind of hikers who boldly go where most would not tread, you have probably heard stories about water filters failing. It does not always happen or even almost always happen, but it happens often enough that you should definitely have a back-up plan.

Additionally, if your water filtration system is at home and an emergency situation arises while you are away from home, you may need to filter water to survive until you can get home. You need a plan for an impromptu filter. Here are the steps for creating a simple impromptu filter. Make sure everyone of age in your family knows how to filter water on the spot.

Step 1: Find an empty container. A large can or two-liter soda bottle works well. Clean the container as well as you can. If you cannot find a container, try to improvise with whatever you can find. In some instances, you may be able to use large plant leaves or peel a piece of tree bark from a birch tree and create a "cone" with a very small opening at the pointed end of the cone. If you happen to have a rubber band, hair ribbon, piece of string, paper clip, safety pin, tape, etc., use it to hold the cone closed.

Step 2: Look around and find filler material such as pebbles, cotton material, or even grass or shredded plants. Just make sure they are not poisonous plants or chemically-sprayed grass! Put the filler material in the bottom of the container or cone.

Step 3: Add a layer of gravel on top of the filler material. This will provide you with another layer of filtering. If you happen to have access to charcoal (not the easy-light kind that is soaked in starter fluid!), you can also add a layer of crushed charcoal to help improve the taste of the water. You may be able to find charcoal from a burned-out campfire.

Step 4: Fill the container (bottle, can, cone) with sand.

Step 5: Now, add your sourced water. Pour it through the filter and catch it in another container that is placed underneath the filter. The water may

need to be processed through the filter more than one time before it comes out clear.

Keep in mind that filtration can remove dirt and other debris from the water but may not remove bacteria that causes disease. Filtration is the first step in the process. Next, you will need to purify the water.

Purification Methods

There are a few methods that can be used to purify water and rid it of microorganisms that can make you sick. You should be familiar with several methods so you can implement the most appropriate method for your particular circumstances when an emergency arises.

Boiling Water

Boiling water is a successful method for removing microorganisms that can cause hepatitis, typhoid, dysentery, and other water-borne illnesses, but it does not absolutely render water one-hundred percent pure. Boiling water does not remove chemicals or other contaminants such as heavy metals or salts. Here are the steps to take for purifying water by boiling it:

- Strain out particles, using a coffee filter, clean cloth, or layers of paper towels. If you do not have anything to strain the water with, let the water sit so the particles settle on the bottom of the container.
- Fill a large pot or kettle with the sourced water. Put the pot or kettle on the gas stove top or over a fire. (Remember that in the event of an emergency such as a HEMP attack, the electric stove top will not work.)

- Bring the water to a full rolling boil and let it boil for at least one minute and up to about ten minutes. You want to be sure the water is thoroughly boiled, but keep in mind that the longer the water boils, the more of it will evaporate.
- Let the water cool so you do not burn your mouth when you drink it. Now, the water is safe to drink, but it will taste flat. Of course, if you are in an emergency situation, you cannot be too picky about how the water tastes, but you can improve the taste by oxygenating the water. To do this, pour the water back and forth between two containers.

Chlorination

Chlorination is another method for purifying water. Chlorination is the process of adding household bleach to water to kill bacteria and disease-causing microorganisms. The household bleach that is used for purifying water should be regular, unscented bleach that contains 5.25 to 6.0 percent sodium hypochlorite. Scented and color-safe bleach should not be used and old bleach that has been opened for some time should not be used as it could have lost its potency over time. Keep a fresh bottle of bleach in your emergency kit!

Here are the steps for chlorinating your sourced water:

- First, strain the water to remove larger particles. (See how to strain the water in the boiling water section above.)
- Add 1/8 of a teaspoon of bleach to each gallon of sourced water. Stir the water and let it stand for 30 minutes.
- After 30 minutes, the water should still smell slightly of chlorine bleach. If it does not, repeat the process.

Pool Shock

Swimming pool owners use a product referred to as “pool shock” to disinfect the pool so it is safe for swimming. Pool shock can also be used during a water crisis to treat soured water so that it is drinkable. Pool shock is sold in powder form in pool supply stores or hardware stores. It is fairly inexpensive and can be easily stored for long periods, making it a good addition to the survivalist’s preparation supply.

The process of using pool shock to purify water is as simple as chlorinating water:

- Filter the sourced water.
- After filtration, mix the treatment solution by adding one teaspoon of pool shock to two gallons of water and stirring. Mix only as much treatment as you need for the current time, as the treatment will lose its potency.
- Add the treatment solution the water. The ratio is one part solution to 100 parts water. This works out to one-pint of treatment solution to 12.5 gallons of water.
- After you mix the water and treatment solution, the water will have a faint chlorine smell. To eliminate most of the smell, you can pour the water back and forth between two clean containers.

Colloidal Silver

Silver has been valued as a purifying element since ancient times when the Phoenicians stored water in silver containers to purify it. As recently as in times before refrigeration and pasteurization, people put silver coins in their milk to preserve it. Today, small amounts of silver are included in

products such as antibacterial socks, anti-microbial underwear, or even sterile medical supplies such as bandages. The International Space Station uses silver to purify their drinking water, and in many developing companies silver is used as a water treatment method.

How does silver work for purifying water? When silver comes into contact with water, it releases silver ions. The ions dissolve in the water and kill bacteria. This is a process that takes several days. Instead of going through the lengthy process to wait for the ions to kill all the bacteria in water, you can use colloidal silver, which is a liquid mineral supplement with the mineral component being microscopic pieces of silver. You can purchase colloidal silver at most health food stores or online. Colloidal silver may be advertised as a healing supplement in addition to its purifying qualities.

There is some controversy surrounding colloidal silver. It is said that prolonged or excessive use of colloidal silver can create a condition known as argyria, which is when the silver accumulates in the body's tissues and organs. When the body tries to rid itself of the silver by pushing it out toward the skin, the person's face and hands turn a grayish-blue color. Therefore, if you use colloidal silver for water purification, follow the instructions carefully and do not be tempted to use more colloidal silver than recommended for purifying water. Using colloidal silver for water purification should be only a temporary part of your safe water system during an emergency.

Oxidation via Chemicals and Ozone

Water can also be purified by the process of oxidation, using ozone or chemicals. When using this method, the ozone or chemicals are injected into water, which is then purified through the resulting oxidation. Common

oxidation agents include sodium permanganate, potassium permanganate, Fenton's Reagent (a mix of hydrogen peroxide and iron salts), persulfate, and ozone. Oxidation does not come without some downsides, including that permanganate and persulfate agents can often leave a chemical residue in the water. Ozone does not leave behind the chemical residue, but generating it requires a huge amount of energy, which is usually not available during emergency situations. Ozone also reacts with the minerals in the water during the treatment process.

Solar Stills

Purifying water with a solar still is an ancient method that was often used to make saltwater drinkable. Solar distillation was described in the Fourth Century BC by Aristotle and more technologically advanced forms of it are still used today. In 1872, in Chile, a large-scale solar still was built that consisted of 64 basins that provided up to 20,000 liters of water per day to the mining community. During World War II, the U.S. Navy built 200,000 inflatable stills to use aboard their lifeboats.

The history of the solar still proves its worthiness to be among water purification methods that are still used today. The method takes advantage of the sun's heat to cause the contaminated water to evaporate. This separates the water vapor from the impurities or salt that were in the sourced water. The purified water then condenses on the still, which makes it easy to harvest and use.

There are different designs of solar stills on the market today, but there is one design that has been field-tested and proven effective. That design is a single-basin model that centers around a basin that is covered by a sloped

sheet of plastic or glass, allowing the polluted water to drain out of the solar still and into a trough or tube.

Solar stills come in a variety of sizes and prices. It's important to think about what your needs for the still might be and what would be the best still that fits within your budget. You should also consider that black basins are the best at absorbing the sun's energy to process the water faster. Glass-covered still usually hold up better than plastic-covered ones, but you have to take precautions not to break the glass. Plastic-covered stills are lighter-weight than glass-covered ones and may be the best option for a portable system, especially if it is to be stored in your bugout emergency bag. You can purchase solar stills through stores that sell survivalist and camping supplies.

You can also make your own simple solar still. According to the U.S. Department of Energy, you can build a simple solar still with just a few common objects that you have around the house: mixing bowl, rubber band, cup, plastic wrap, and a stone or another weight. Here are the instructions for the simple solar still:

- Pour a few inches of salty or contaminated sourced water into the mixing bowl.
- Put an empty cup in the center of the bowl.
- Cover the bowl very tightly with plastic wrap and carefully seal it over the bowl so there are no gaps.
- Stretch the rubber band around the edge of the bowl on top of the plastic wrap to hold the plastic wrap in place.
- Put the stone or another weight on top of the stretched plastic wrap, in the center of the bowl. The weight should be heavy enough to cause

the plastic wrap to dip over the cup in the bowl but not so heavy that it tears the plastic wrap.

- Put the solar still in a sunny place so the water will evaporate, condense on the plastic wrap and drip into the cup.

You should note that the greatest harvest of clean water from your still will happen in the evening when the basin is still warm, but the outside temperature is starting to cool. You can also use your solar still to harvest underground water if you dig a hole at least 15 inches deep to put the container in. Your underground solar still should produce about a quart of water per day from condensation.

Ultraviolet Water Disinfection

If you prefer not to add chlorine bleach or other chemicals to your water to purify it, you may consider the ultraviolet (UV) disinfection method for safe drinking water. UV disinfection systems use a UV light source that is enclosed in a transparent protective sleeve. The unit is mounted so that the water passes through a flow chamber where the UV rays are admitted and absorbed into the stream of water. The UV rays kill viruses and bacteria by rearranging the genetic material (DNA and RNA) so it cannot reproduce and cause disease.

Many people prefer UV disinfection because it is natural, environmentally friendly, and cost-effective. However, it should be noted that UV disinfection is a supplemental method that is best used along with another purification method as it works best on water that has already been partially treated. A good combination is to use the UV disinfection method in conjunction with a reverse osmosis filter.

SODIS Disinfection Method

UNICEF pioneered the SODIS method of water purification in 1984. Since then, it has become a standard all over the world for making contaminated water drinkable by using the sun's UV rays as a disinfectant. The method has been endorsed by such humanitarian organizations as the Red Cross, the World Health Organization (WHO), and UNICEF.

The SODIS method should not serve as your stand-alone purification system, but it can be a valuable disinfection method for the survivalist, especially during a time of crisis. The sun is always available even when you may not have chlorine bleach, filters, or the means to boil water. The method is very simple, effective, and anyone can implement it to create drinking water in just a few hours (usually under six hours). Here is how to use the SODIS method:

- Step 1: Find a small clear plastic bottle that is less than three-liter size. The bottle may also be glass but it must be clear, colorless, and transparent. PET bottles that have the PET recycling mark on the bottom are the best to use if one is available. (The mark will be the numeral one surrounded by three arrows that form a triangle around it.) Remove labels from the bottle if there are any but be careful not to scratch the bottle. It is best if the bottle is not scratched. If a bottle is not available, you may use a clear plastic bag, such as a freezer bag or storage bag. Of course, you may use several bottles if they are available to collect more water. Thoroughly wash the bottle.
- Step 2: Fill the clean bottle about two-thirds full with water and cap the bottle tightly. Shake the bottle for about 20 seconds.

- Step 3: Put the bottle in direct sunlight. If less than half of the sky is covered by clouds, your water should be completely disinfected and ready to drink in about six hours. If more than half of the sky is clouded, you should leave the bottle out for two full consecutive days. That is a long wait, especially if you are thirsty, but your body can survive for two days without water and it will be a great comfort knowing that at the end of two days you will have water.

The SODIS method works best if you can filter the water first. At the very least, try to filter the dirty water through a paper towel, coffee filter, grass blades or thin cotton cloth such as a bandana to remove the debris. Water that is cloudy or muddy should definitely be filtered before implementing the SODIS method.

Remember that the SODIS method is dependent on sunlight to be effective. The method works if the temperature is low, but will not work effectively if the sun is not shining through the clouds at all or if it is raining. It would be better to collect and filter rainwater on a rainy day than to try to purify water with the SODIS method.

Also, remember that the SODIS method will not instantly produce clean drinking water. You must be prepared to allow plenty of time for the method to work.

Even though you have learned in this guide that a water crisis is probably something that you will have to deal with in your lifetime, you have also learned that there is water to be found in nature and in your home, and there are several filtration and purification methods that you can use to make water drinkable. In other words, with preparation, you can survive a water crisis!

The Aqua Tower

Atmospheric water generation (AWG) is a method that harvests fresh water from the air. This method is environmentally friendly and relies on the principle that there is more than 3.4 quadrillion gallons of water in the atmosphere at any given time because of the hydrologic cycle of evaporation, condensation, and precipitation.

Water that is generated by this method goes through both UV light and/or ozone water purification techniques and is run through a carbon filter, which means the water produced does not need to go through additional treatment. You can purchase this type of system at online stores that sell survivalists and naturalists equipment or you can build it yourself…

It's way easier and cheaper!

Just follow the step –by-step guide below and you will have your own emergency water supply right in the comfort of your home

Here's what you'll need to build your own Aqua Tower:

Parts

- **New Dehumidifier** – one that is compressor based. – You can find them from $100 to $200

- **A Water Filter Dispenser -** You can find them from $12 to $49

- **Cabin Air Filter** – to replace the dehumidifier mesh filter. – You'll find them from $5 to $40

*** **The Dupont High Allergen Care MERV 11 Air Filters** - This product traps impurities and diminutive solids before they become airborne. These electrostatic air filters are essential for all allergy sufferers

- Water Filter Tap – You can use any kind of tap. A new one goes from $5 to $30

- **Submersible Water Pump** – usually found in aquarium shops. These retail from $20 to $50

- **AC ON/OFF Switch** – Found from $2 to $10

- **Clear Vinyl Tubing** – different diameters – You can get all of them for about $10-$15

- **Lighting cable** – 2 wires inside. From $2 to $10

- **55 Gallon Plastic Barrel Drum and Lid –** A new one can cost from $20 to $75

- **Round Piece Of Plywood** Measuring The Same Diameter Of Your Water Barrel

- **Metal L-Shaped Corner Brackets** - ~20 pcs. Big And Small

- **Nuts and Bolts**

Tools

- Screwdrivers

- Duct Tape

- Scissors

- Permanent Marker

- Box Cutter Knife

- Measuring Tape

- Metal Hacksaw

- Power Drill

- Different Drill Bits

- Double Sided Tape

- Pliers

- Insulating Tape

- Lighter

- Sanitary Silicone& Sanitary Silicone Gun

- Wrench Set

- JigSaw

- Drill Cone Drill Bit

Additional costs for tools and parts ~$100.

Therefore you can build a Aqua Tower with around $270 in total costs.

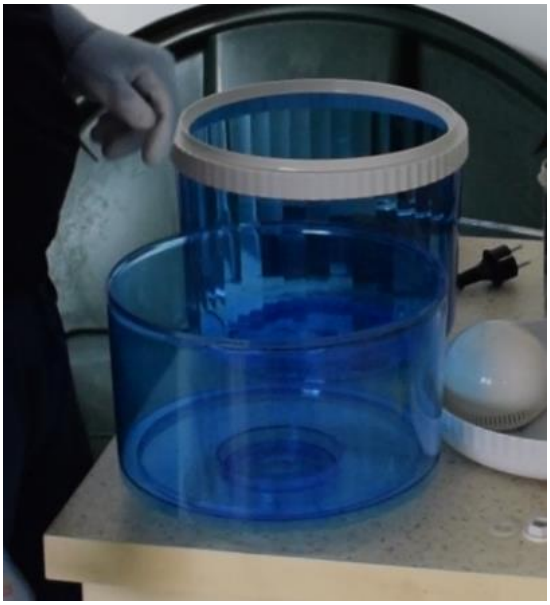
But you might have some of the parts already in your home. This will reduce the building costs significantly. Also, you can buy some of the parts at local flea markets or you can even find some of them at the junkyard.

Obviously if you want to take it one step further, feel free and experiment with more expensive parts and tools. Whatever path you chose – the system you'll end up with - will deliver! It's just up to you how much you are willing to invest in your new water source.

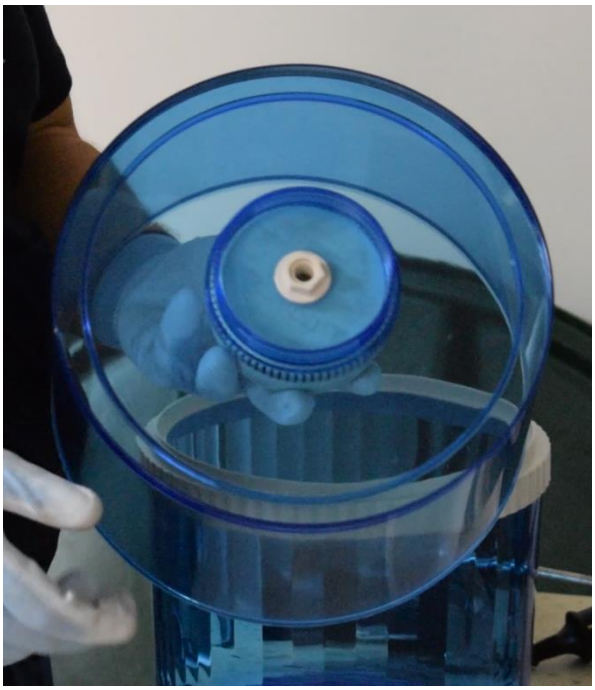
BUILDING INSTRUCTIONS

Step 1.

Assemble the water filter dispenser. Do this by following the manual included.



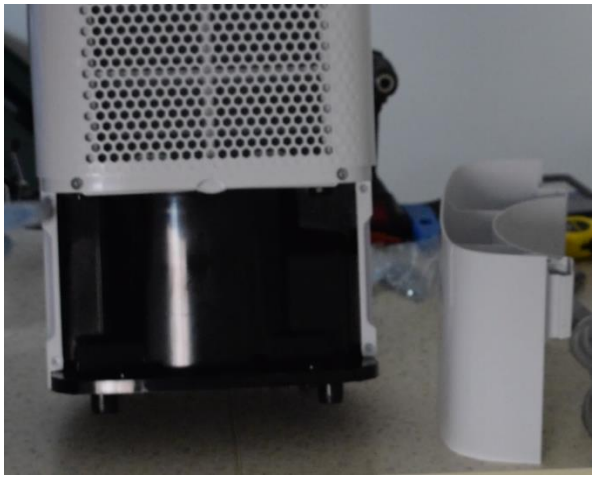
If your dispenser has a hole on the bottom, seal it with some duct tape.



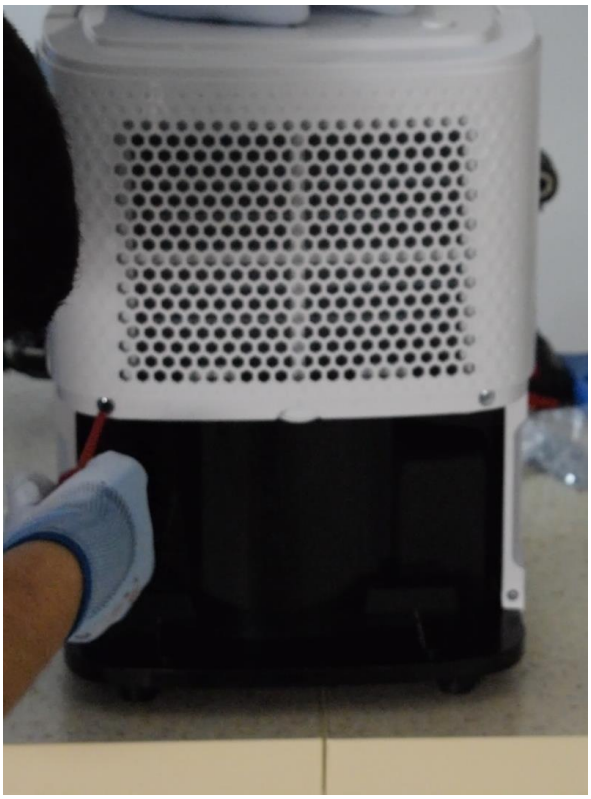
Step 2.

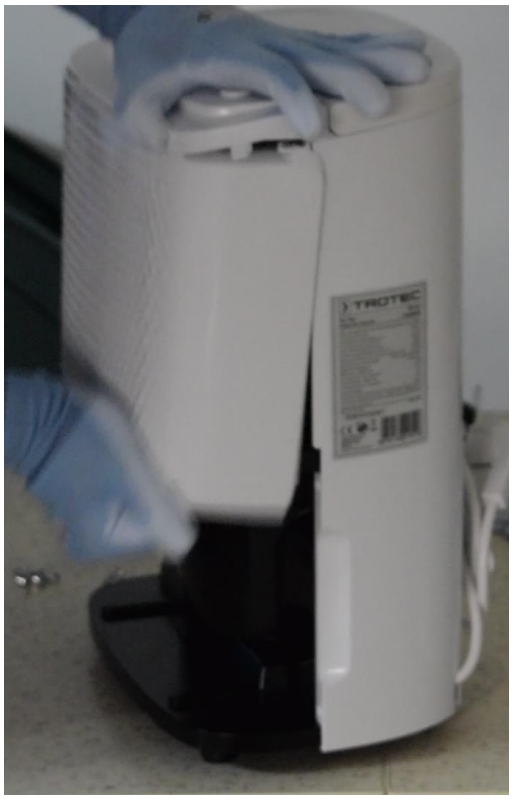
Next move on to your dehumidifier.

Remove the water tray included.

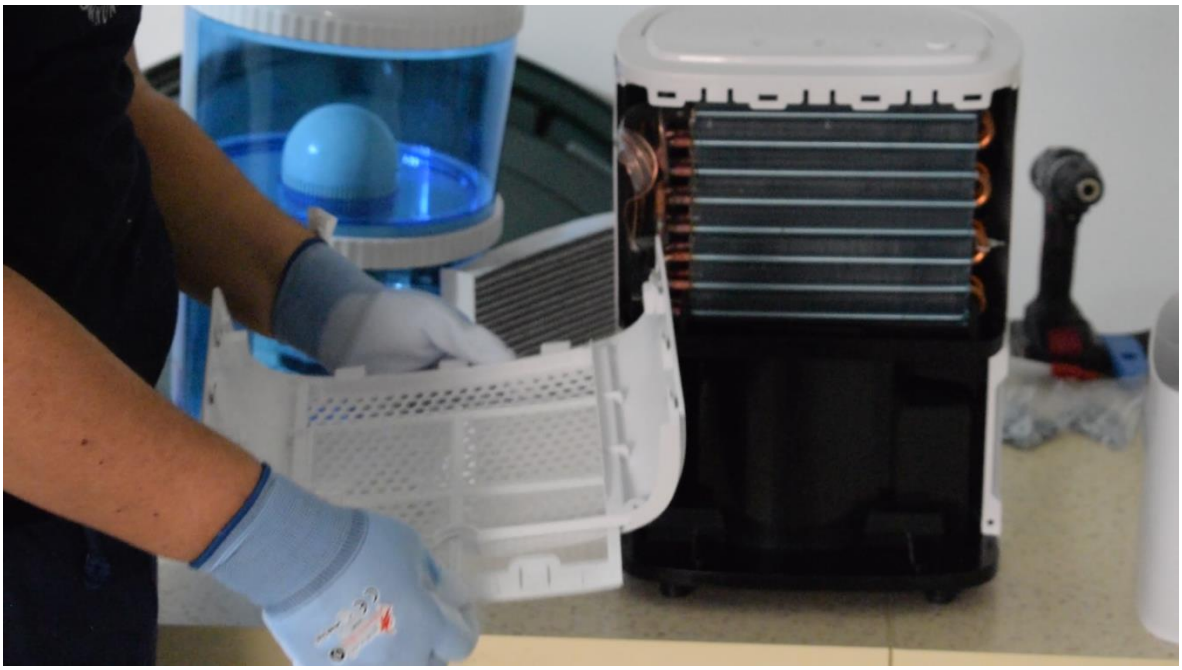


Take off the cover to get to the dehumidifier filter.

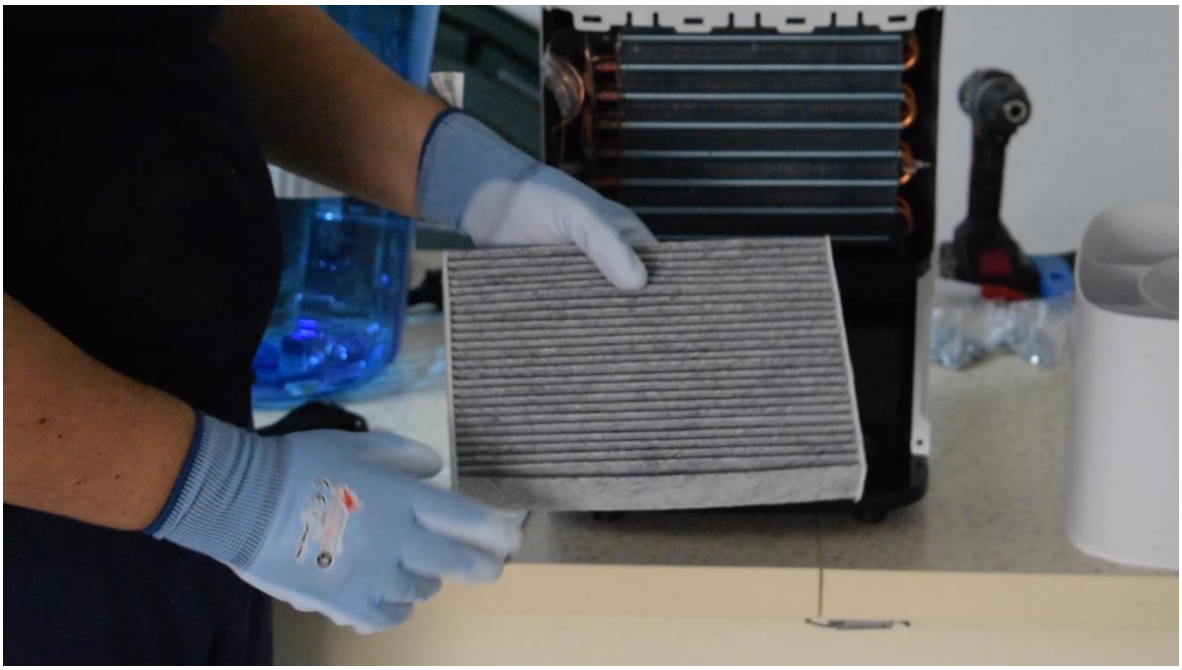




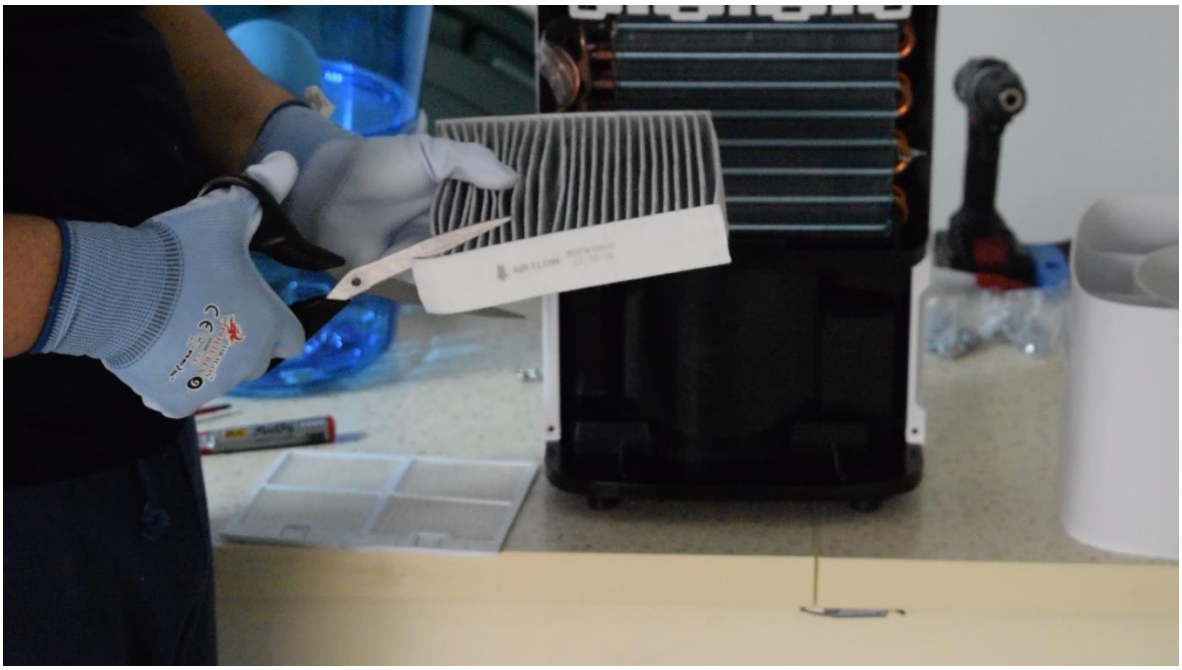
Inside you'll see the condenser of the unit which looks like a car radiator and the air filter.



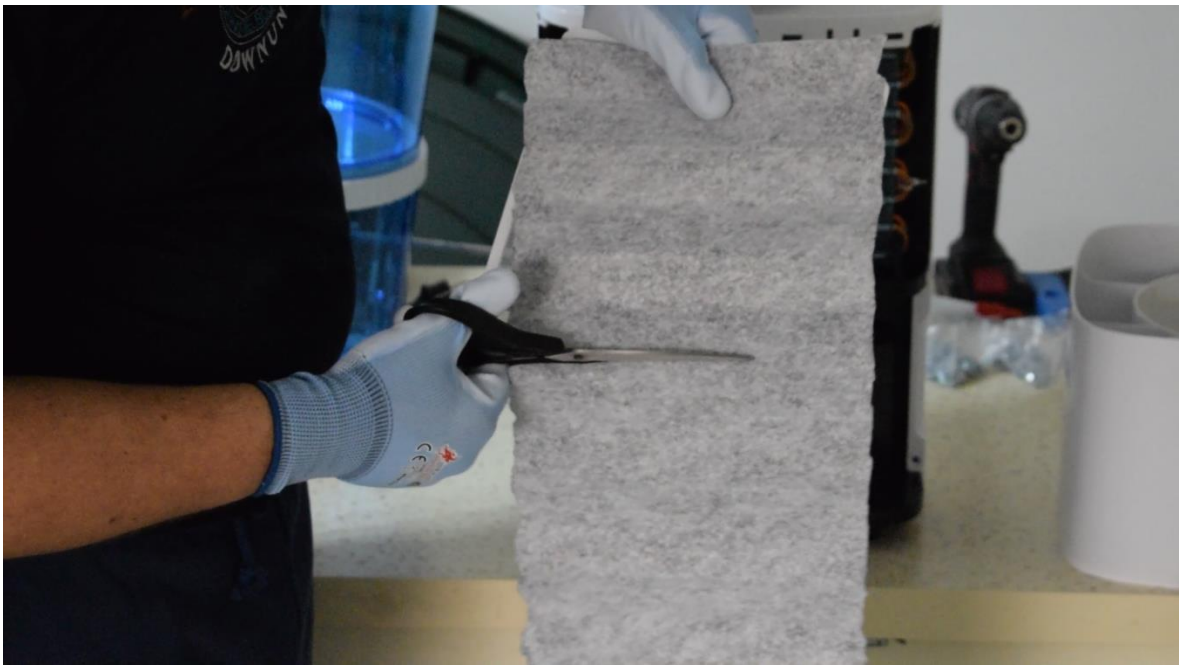
You'll need to replace this filter with a cabin air filter. This will dramatically improve the filtration and reflect in a better water quality.

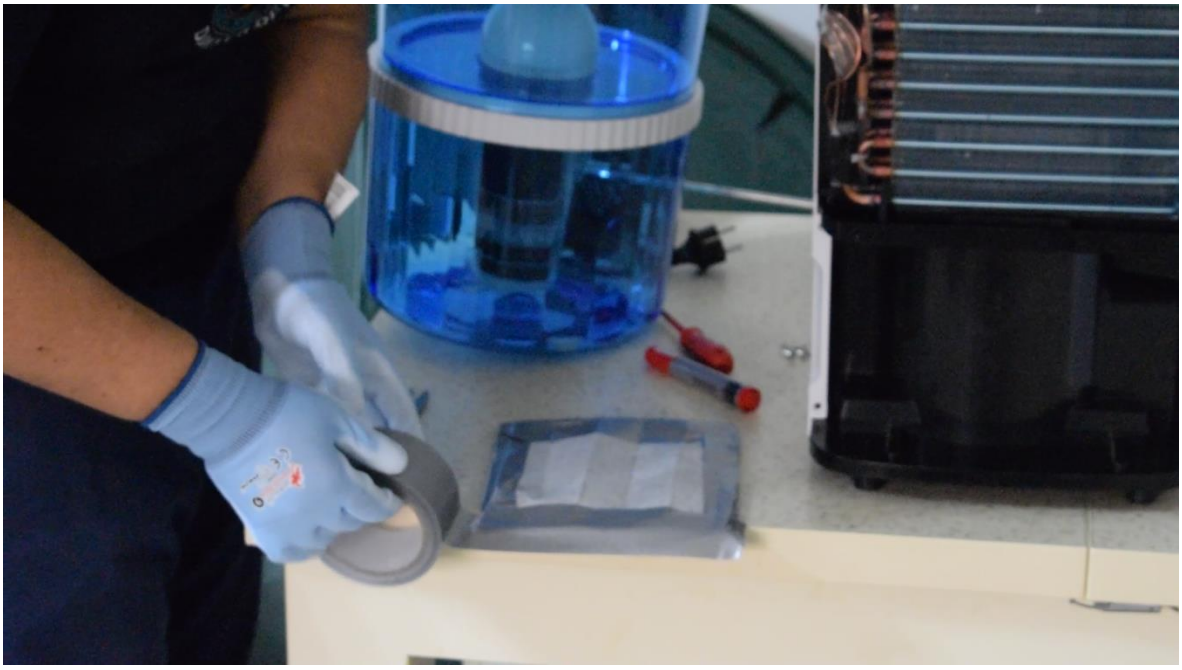


You might need to cut and adjust the cabin air filter to fit in the dehumidifier.



Put the cover back in place.

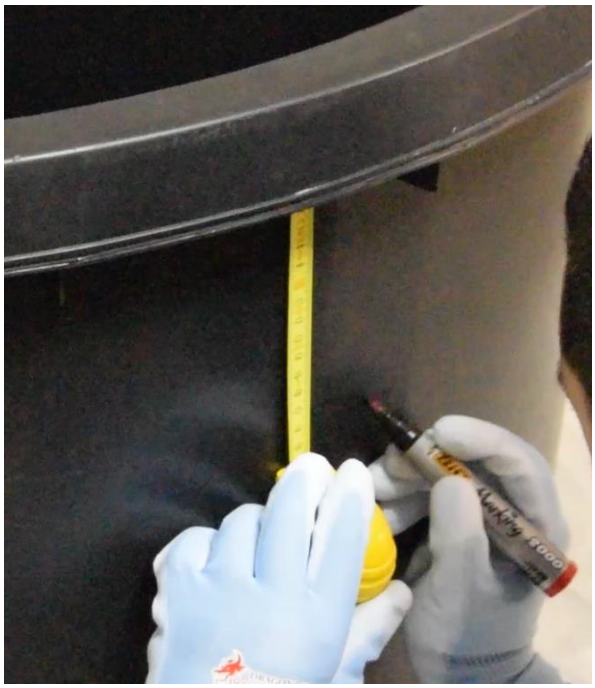




Step 3.

Gather all your parts and let's start assembling.

First measure the height of your dehumidifier up until the filter area. This area needs to stay on top of the barrel.



Now measure this height and subtract it from the height of the barrel drum. You'll need to insert the dehumidifier inside the barrel, leaving only the filter zone outside.

Mark with a marker inside and outside the barrel.

Step 4.

We'll need to make a stand inside the barrel for the dehumidifier to stand onto.

In order to do this you can use some plywood.

We'll use some metal "L"-s mounted inside the barrel which will support the piece of plywood.

Keeping in mind the dimension you measured earlier and a metal “L” as guidance mark the spots for the holes.

Repeat this half way around the barrel, marking the spots for 5 “L”-s. (You can more or less depending on the materials you use.)

Start pre-drilling the mounting holes for the “L” supports.

Don’t start mounting the supports just yet!

Step 5.

Next, take the water filter and measure the top section.

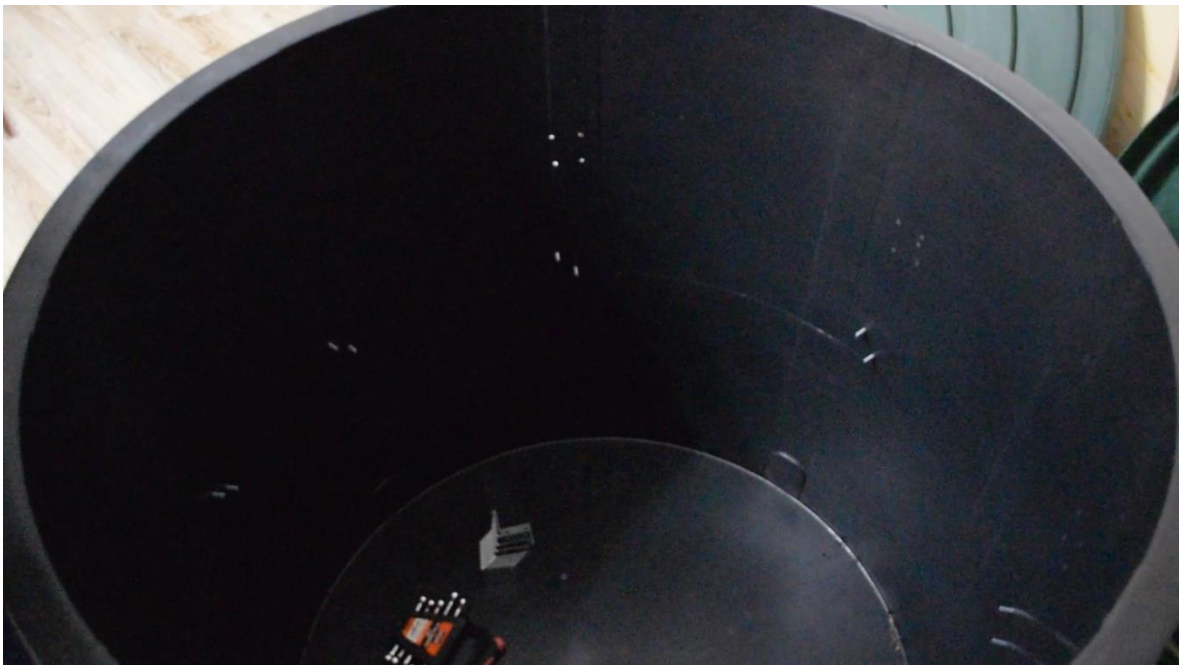
Take this dimension and measure it down inside the barrel – starting at the holes you drilled earlier.

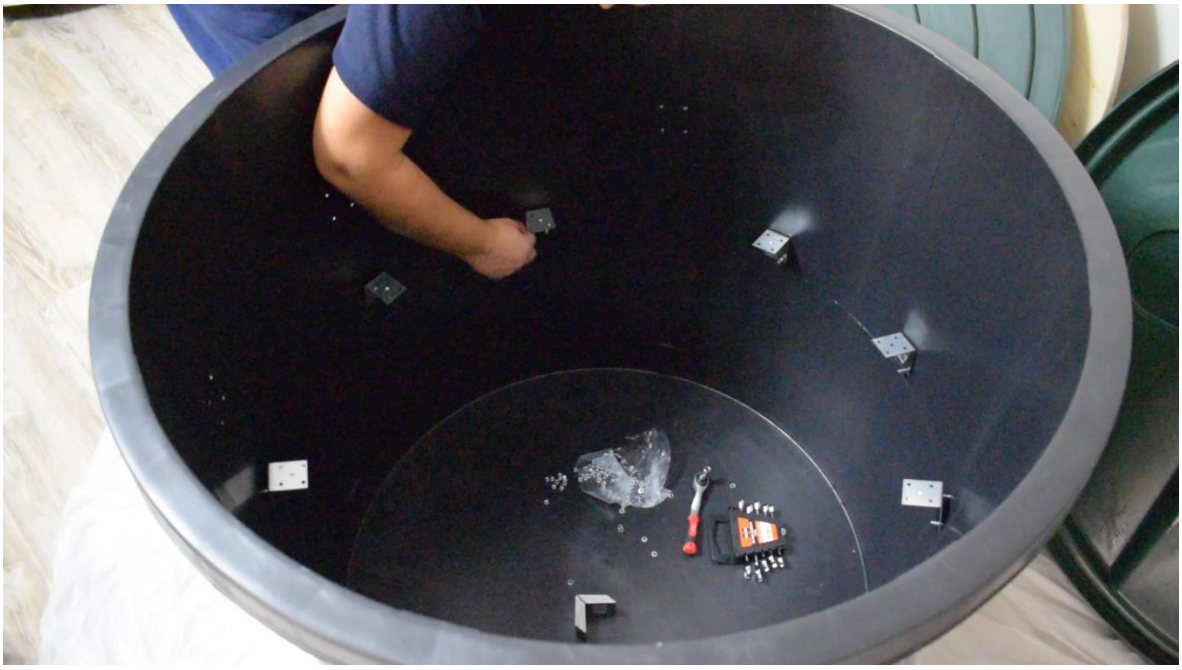
Mark the around the circumference of the barrel on the inside trying to make 6-8 markings.

Now we'll need to create a support for the water filter.

To do that we need a plastic lid or similar circular lid that is the same diameter as the inside of the barrel and 6-8 metal or corner brackets.

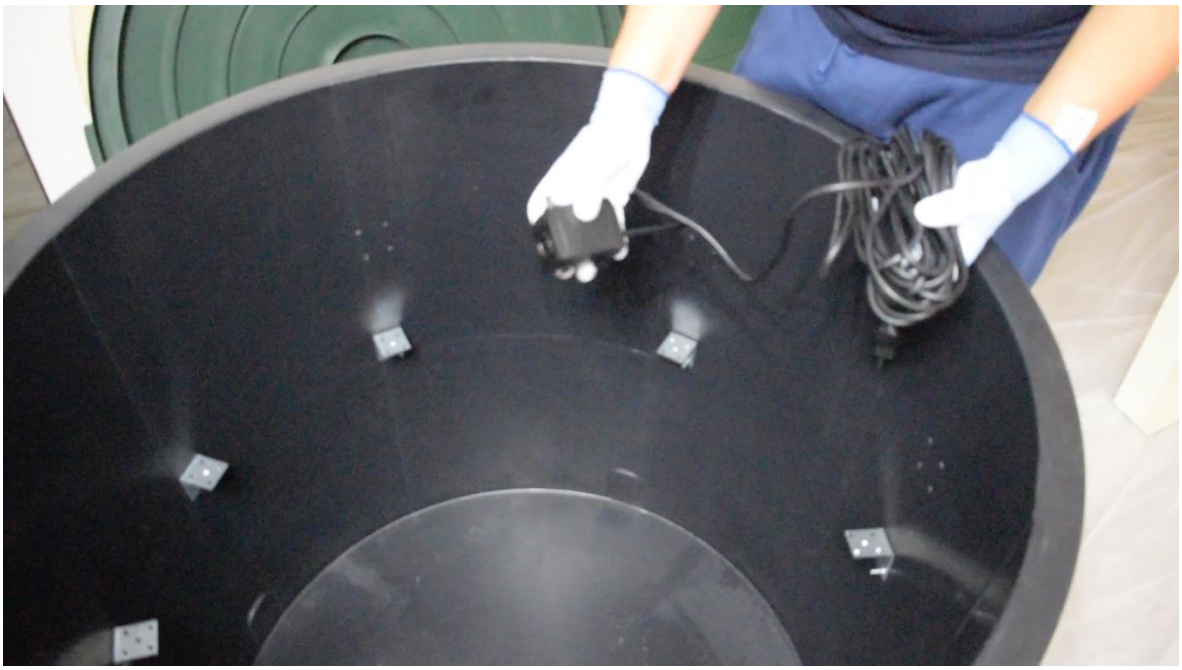
First fix the 6 corner brackets on the inside of the barrel around the circumference of the barrel. You can either use screws or heavy duty glue.

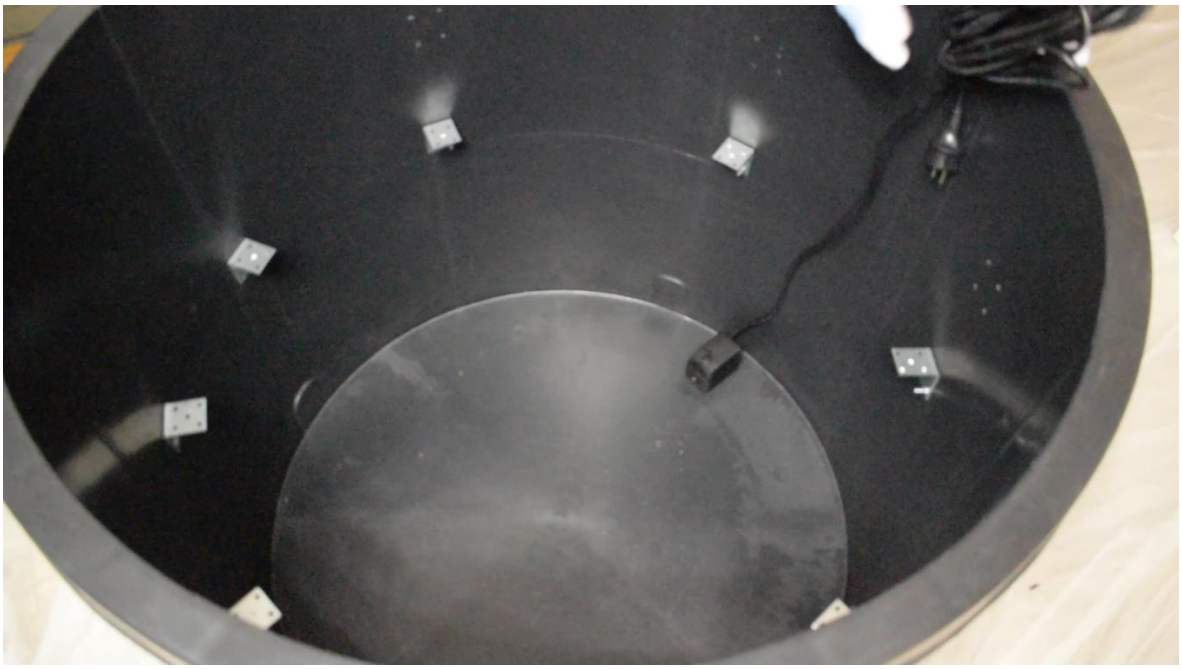




Step 6.

Inspect how the water pump will sit on the bottom of the barrel making sure the power cable is long enough.

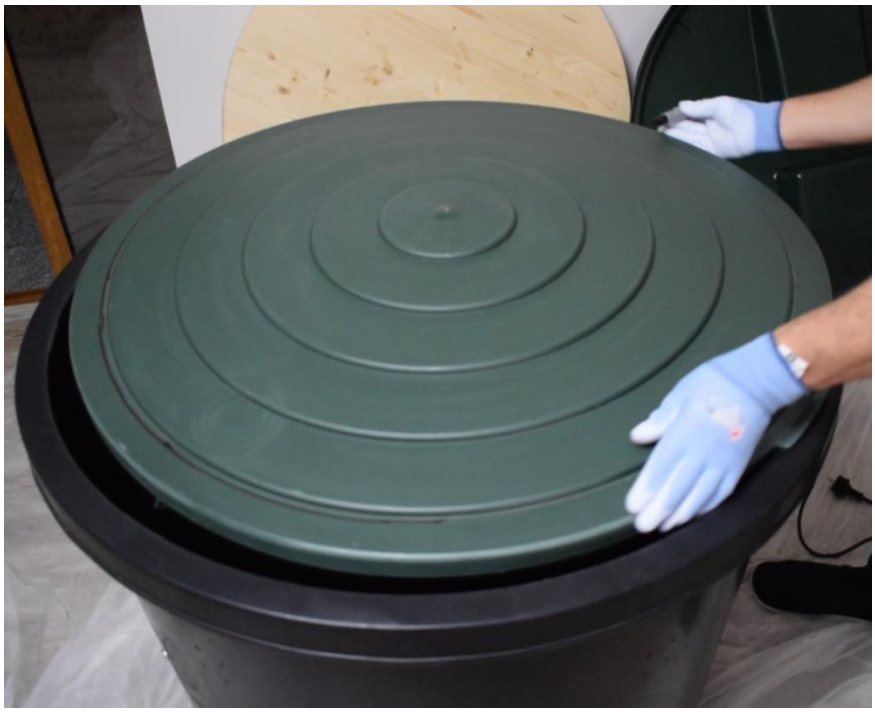




Don’t fix it yet!

Step 7.

Next onto the water filter support – in our case the lid.

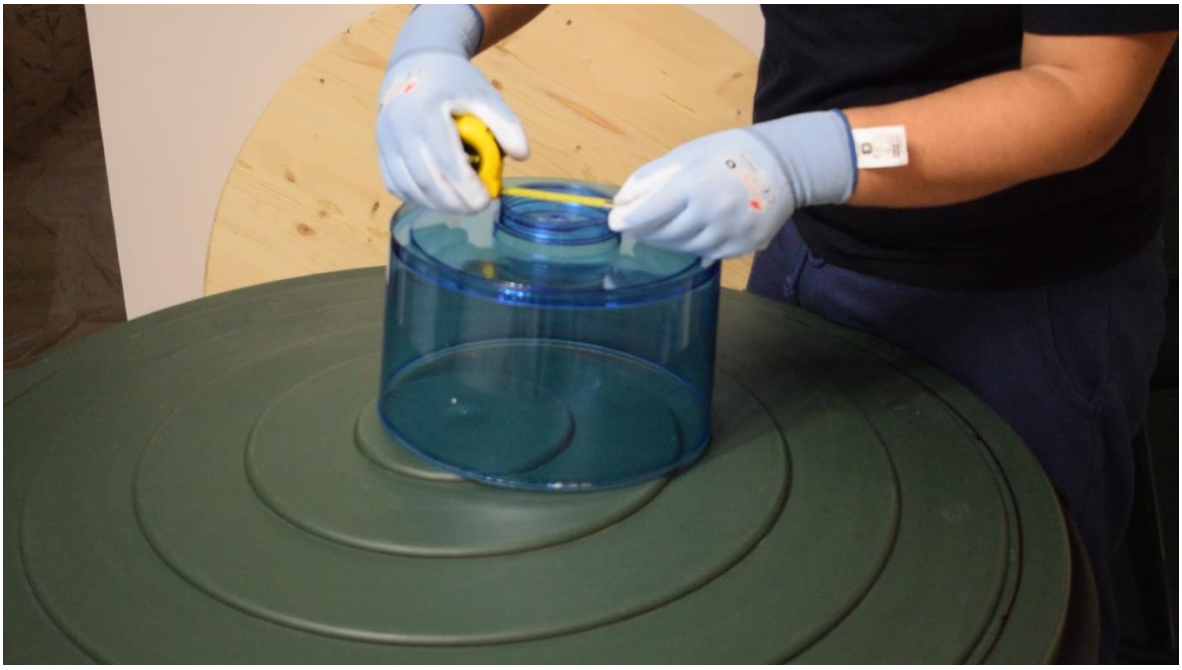


First, we need to make a hole in the middle of the lid for the filter to go through.

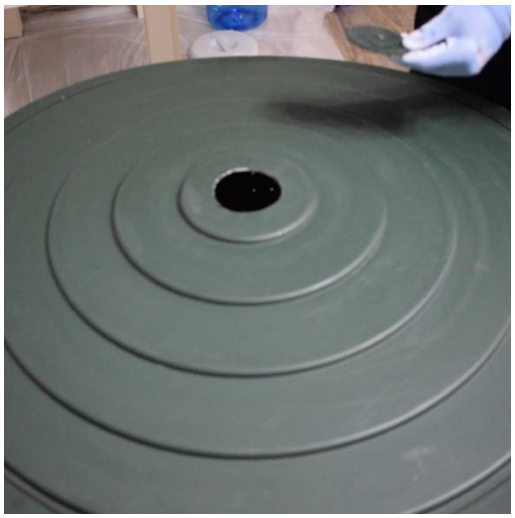
The dimensions of the hole depend on your type of water filter. If your water filter is cylindrical it might have an inner hole that is where the filter itself inserts.

That's the hole you are after.

Measure the diameter of the filter and mark it on the lid – in the middle.

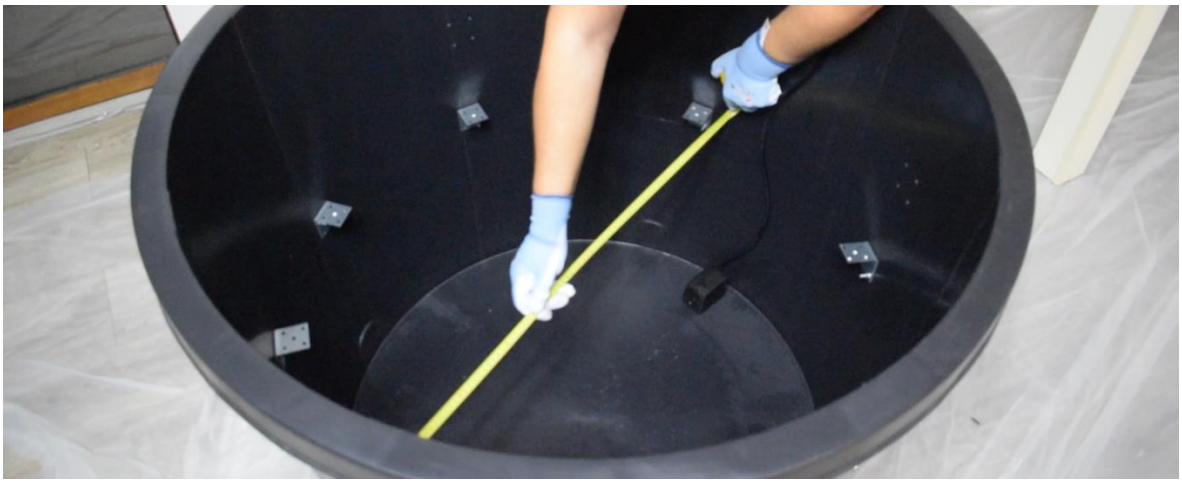



Cut the lid with a box cutter so that the filter can fit through the hole.

Due to the fact that the lid might not have the same diameter as the inside of the barrel, brings us to the next operation. Fitting the lid inside the barrel – onto the lower supports.

First, measure the inside of the barrel:

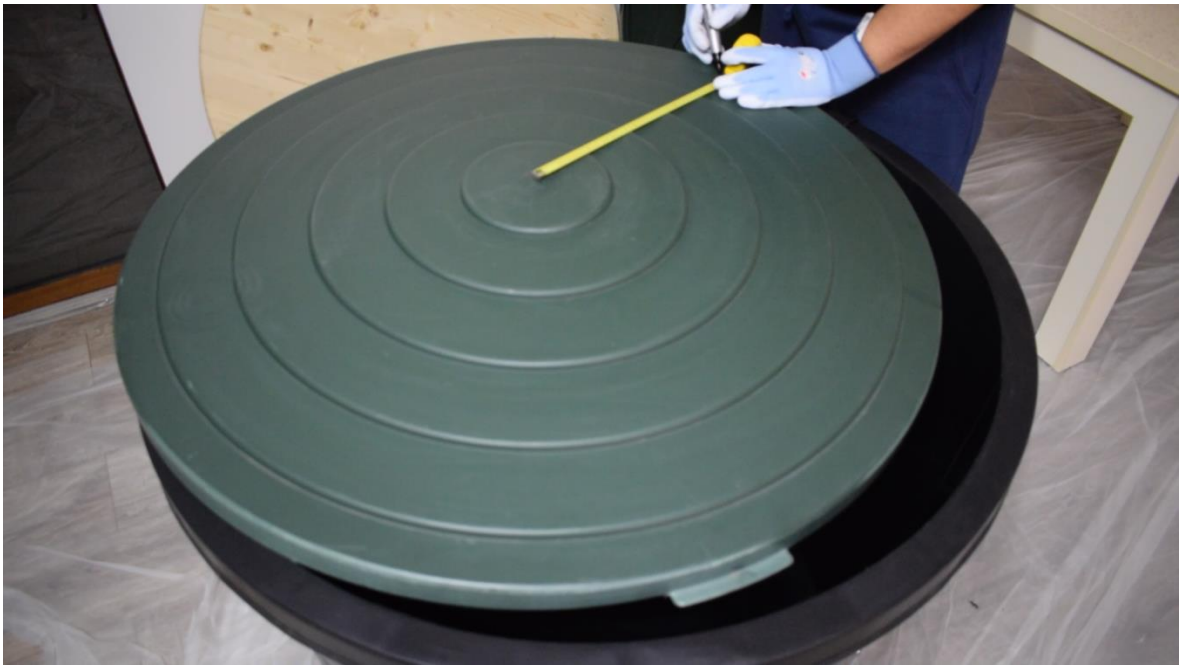


Then, you'll need to measure the lid from the inside out to match this dimension.

Mark around the lid using a marker than use a hand drill to cut the excess.

You'll end up with a perfect fit.

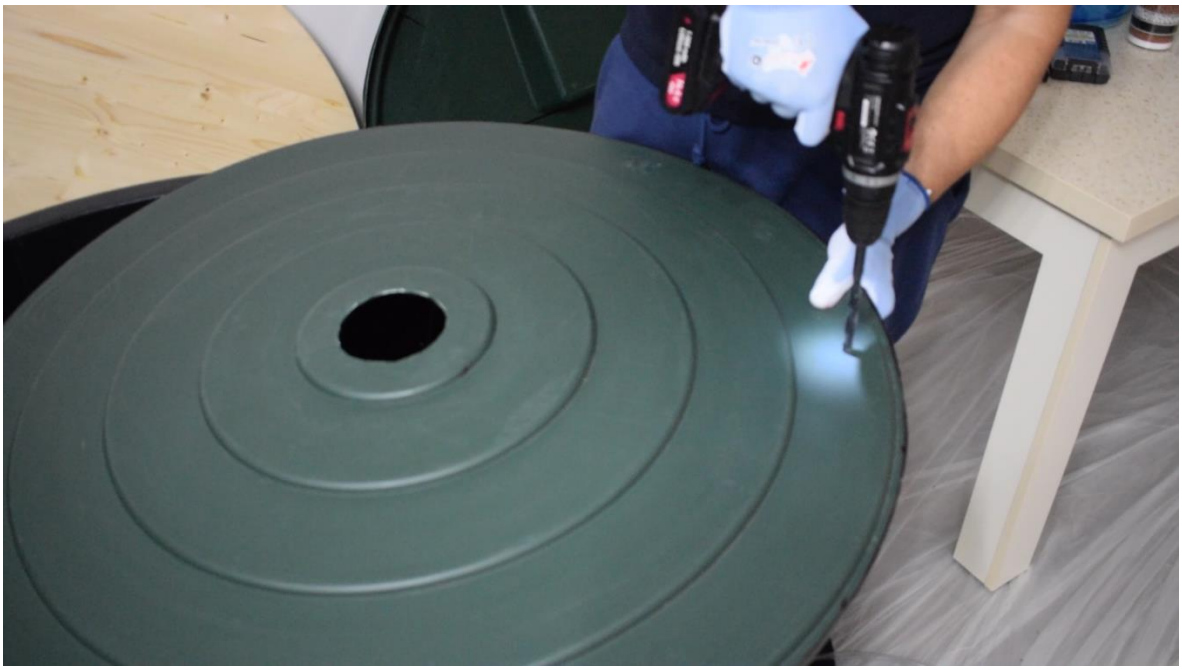
Here's how:



One last operations needs to be made at this step.

You'll need to drill a hole in the lid for the output hose to fit through.

The position is necessarily important – anywhere in the lid.

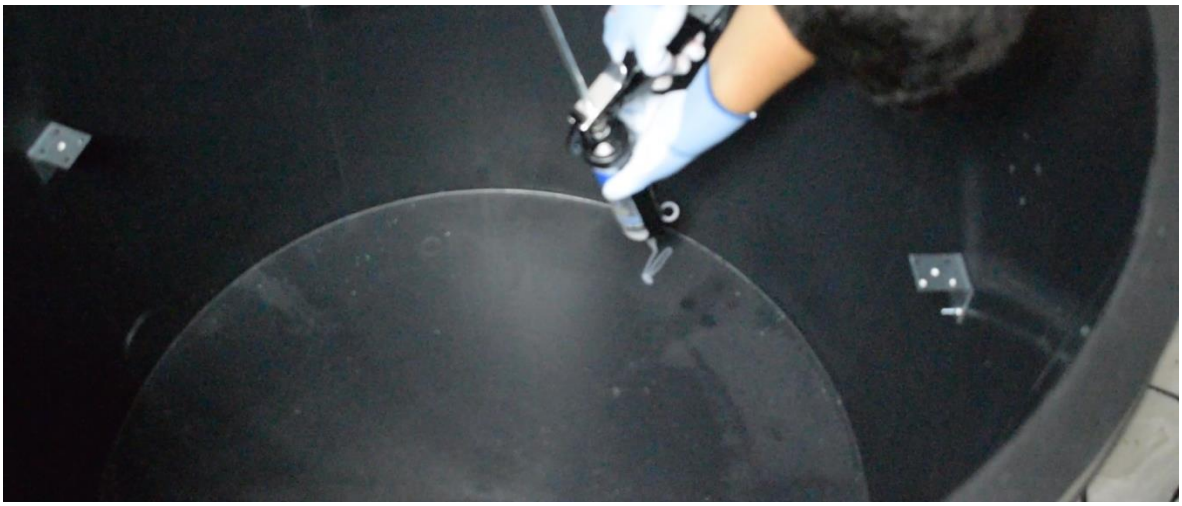


Step 8.

Don’t insert the lid in place just yet – First we need to fix the pump to the bottom of the barrel.

Step 9.

Glue the water pump to the bottom of the barrel. Connect the water pump hose and pass it through the hole in the lid.



Do the same for the power cord of the water pump.

Now you can insert the lid into the barrel – resting on the supports you fixed at step 5.

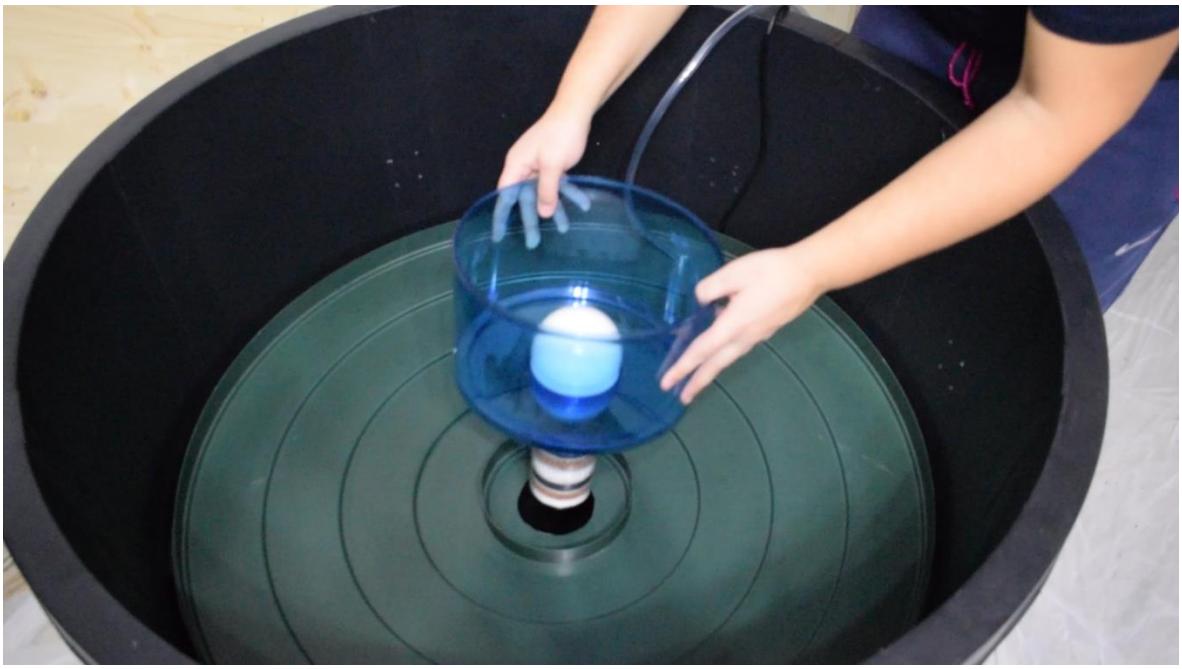
Step 10.

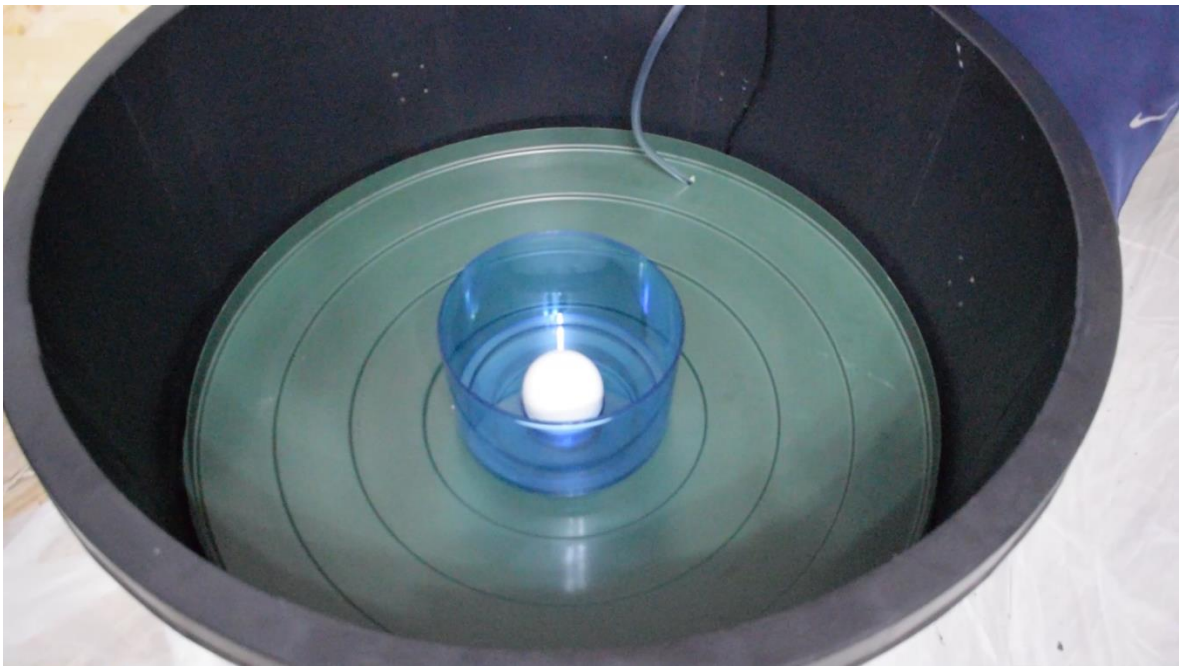
Place the lid on the corner brackets and fix it in place using silicone. You'll need to create a water/air tight fit.

Below this point, under the lid the fresh water will accumulate.

Step 11.

Next you'll need to fix in the water filter on the plastic barrel lid. Don't forget to place the filter back.



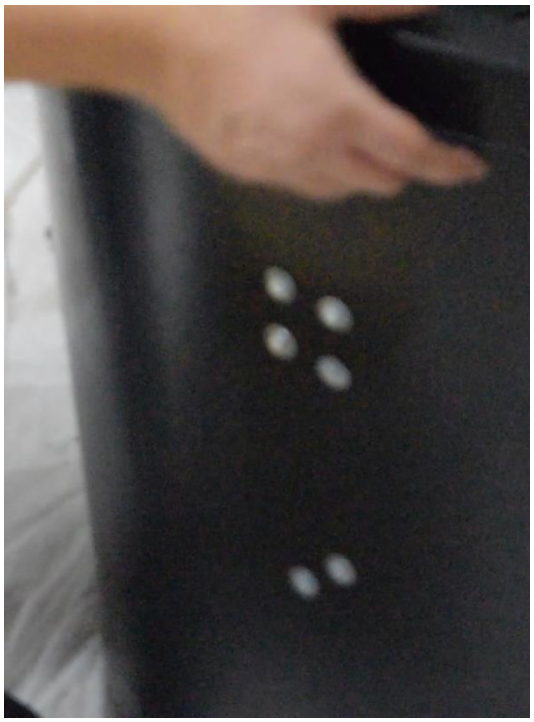


Step 12.

It's now time to create the support for the dehumidifier to sit onto.

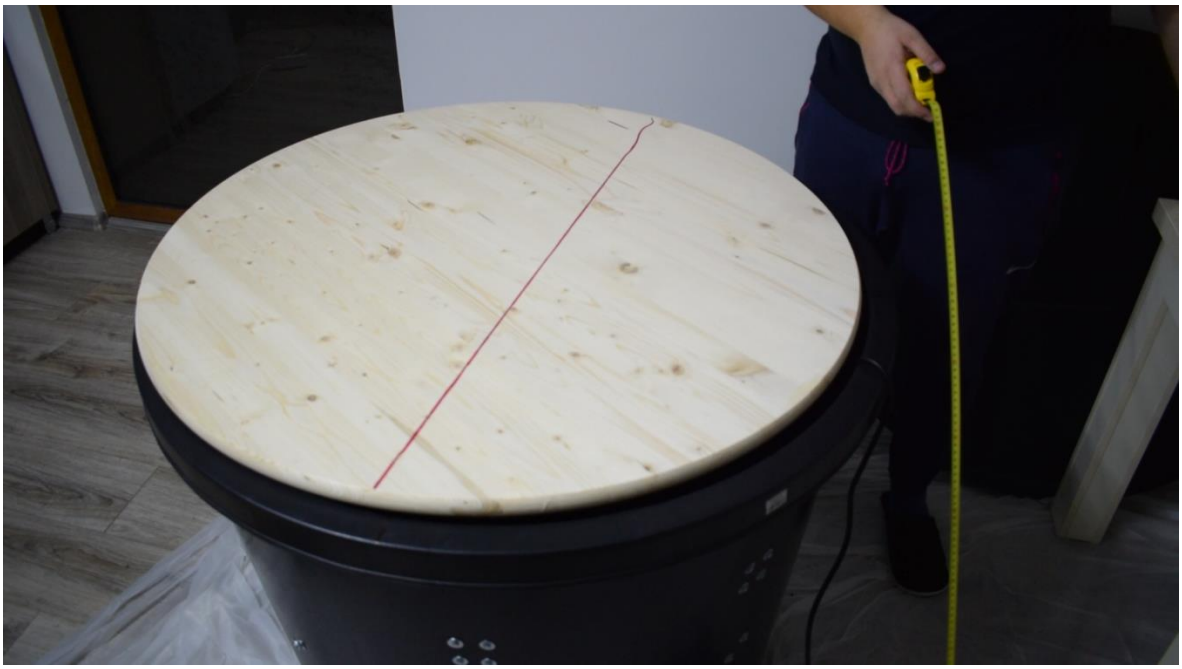
Remember the holes you drilled at step 4?

You can now mount and fix the "L" shaped support on the inside of your barrel.



For this step you only need supports mounted halfway around the inside of the barrel:

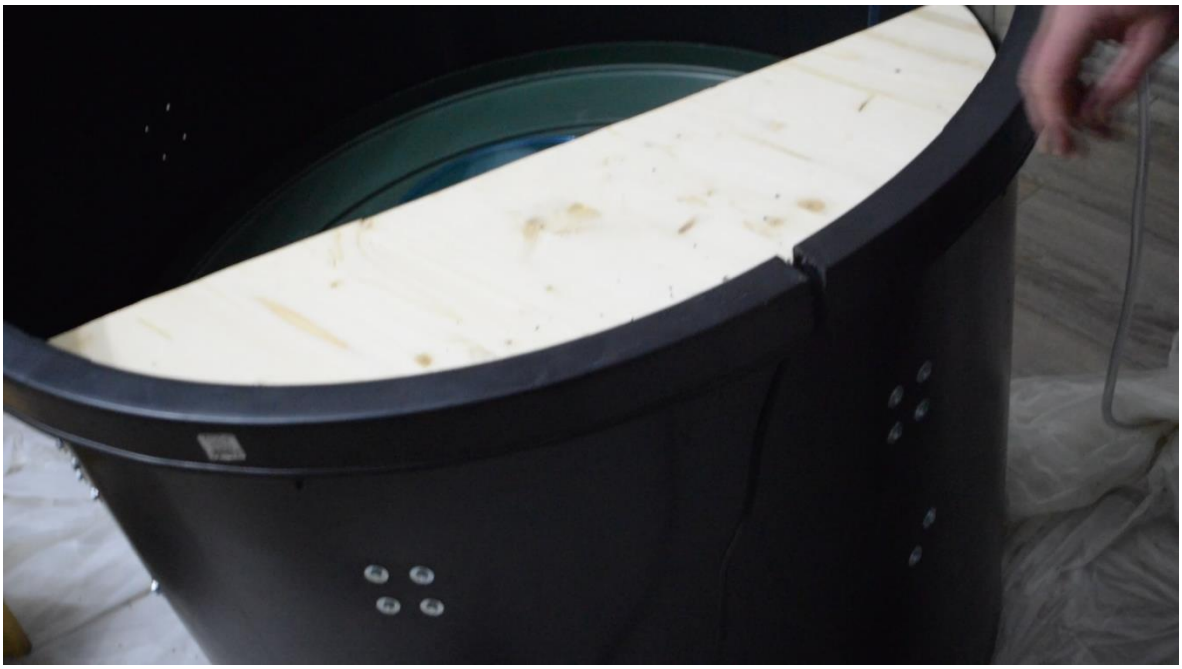
Now let's cut and prepare the plywood for the support. To do that we need to cut it in half so it can fit inside the barrel and onto the supports we just mounted.



Step 13.

On this step we need to make an opening in the top of the barrel so the power line of the pump and dehumidifier will go through.

To do that, mark and cut a small piece from the rim of the barrel:



Step 14.

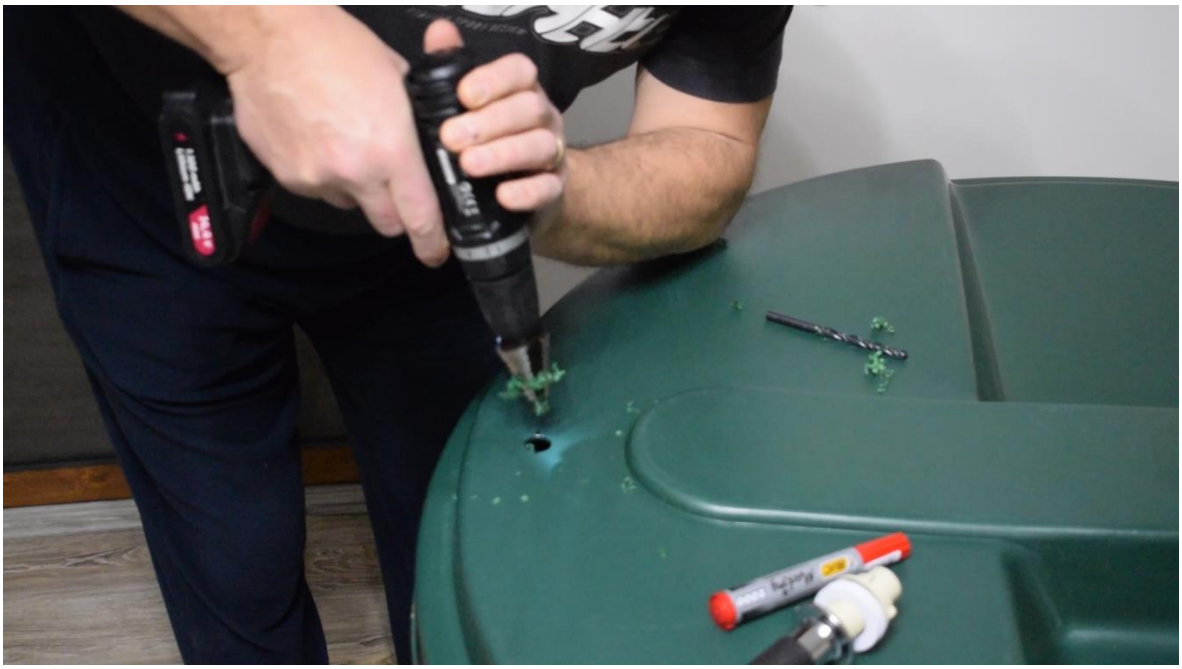
Now let's prepare the lid of the barrel.

We have a few operations to do here.

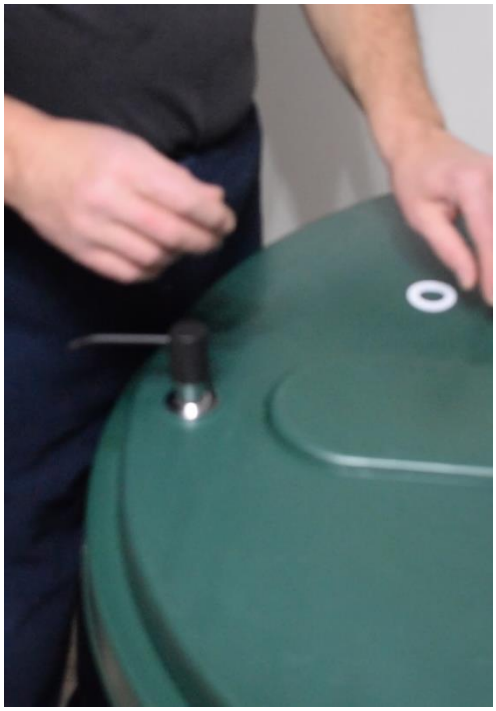
First, let's connect the tap to the lid. We'll need to drill a hole in the lid where the tap will be fixed.

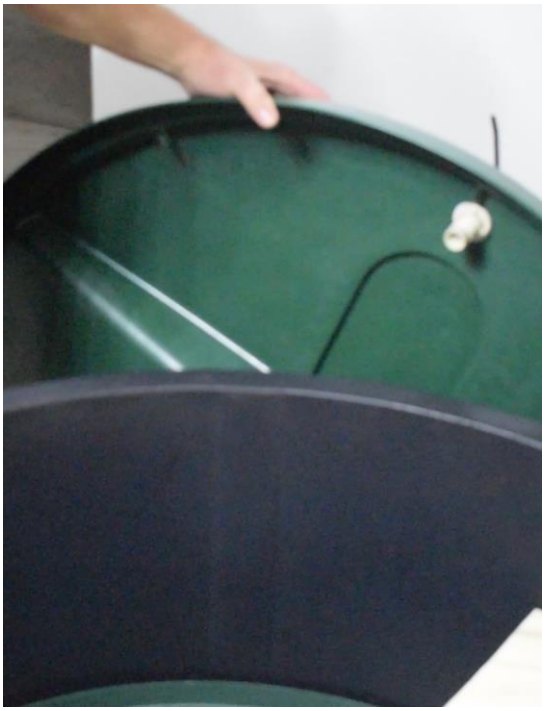
Mark then drill the hole.

Make the hole larger using the special drill bit.



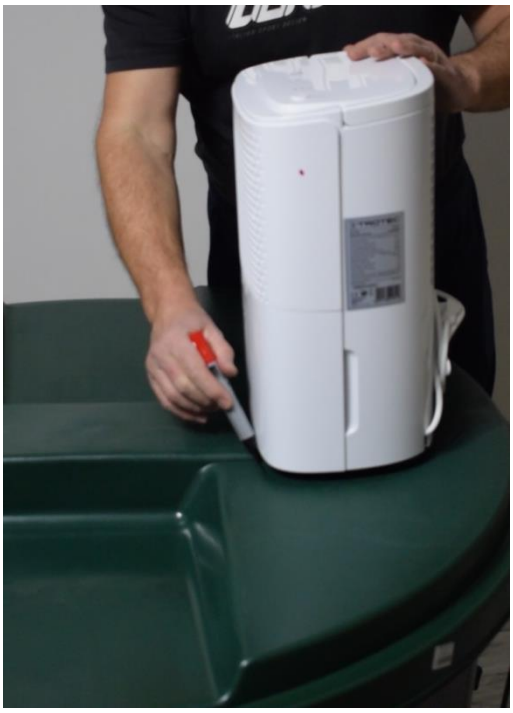
And finally mount the tap in.





For the next procedure: Mounting the dehumidifier inside the barrel and the lid.

To do that you'll need to mark the perimeter of the dehumidifier on the lid and then cut an opening in the lid for the dehumidifier to fit.



One more thing to do here: Drill two holes in the lid for the in/out tubes going to/from the dehumidifier. I drilled them to the left and right of the dehumidifier opening above.

Step 15.

Obviously you'll want the water generated to be as cool as possible.

To do that you'll need to run a thin vinyl hose around the condenser circuit of your dehumidifier.

Go around the circuit 3-4 times or as much as the inner space permits.

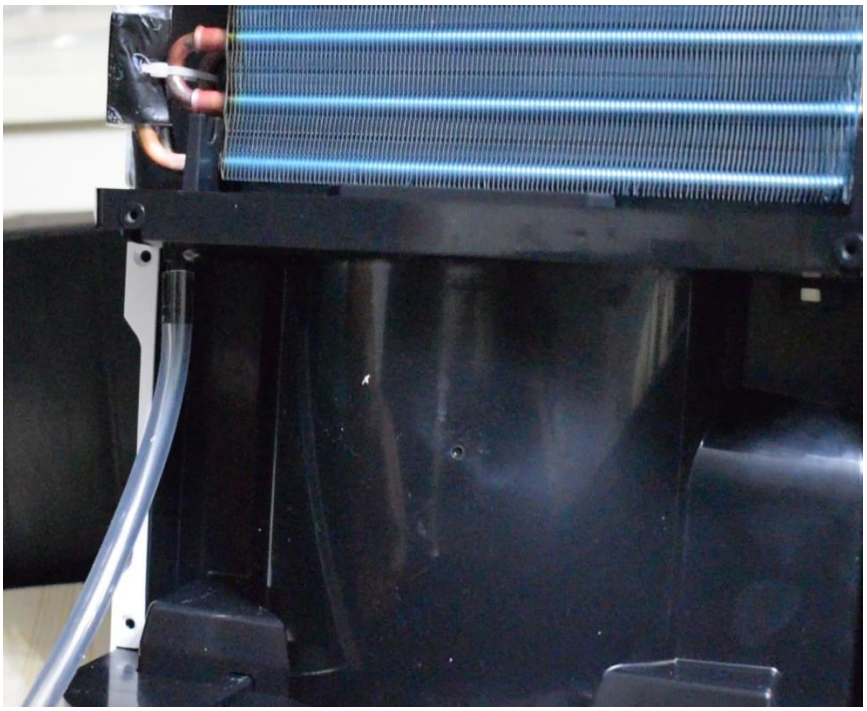
Make/drill on hole on each side of the dehumidifier case for the thin hose.

Make sure that you don’t strangle the thin hose and it fits perfectly inside the compartment.

That's it for the cooling part!

Step 13.

You'll need to bypass the dehumidifier water compartment – the place where water accumulates insides after condensation. Find the draining opening/hole inside the dehumidifier and connect a vinyl hose to it.



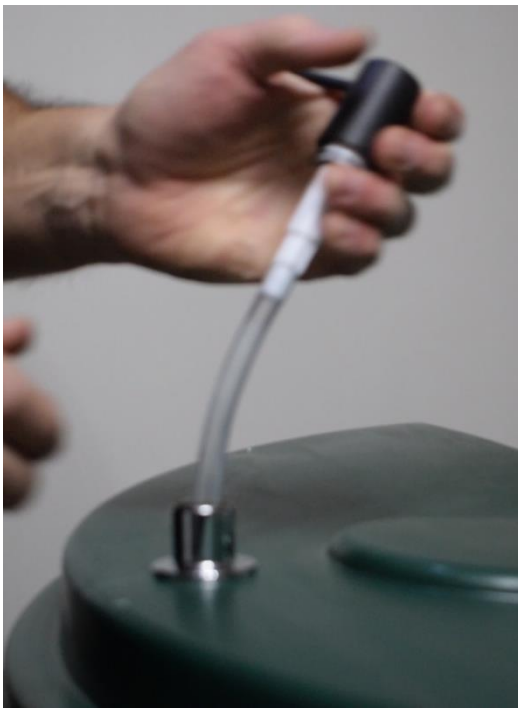
This hose goes into the filter below.

Step 14.

Place the dehumidifier inside the barrel and fix it on its support.

Now place the lid on top.

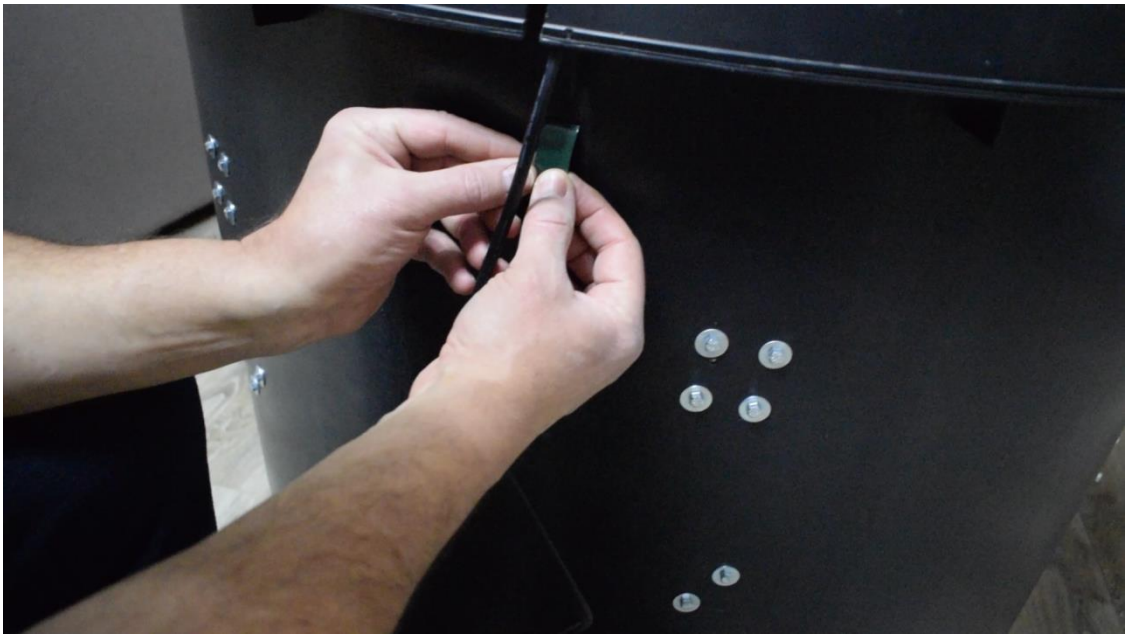
Next for connections – As the picture above – Left tube comes from the pump and the right tube goes to the tap.



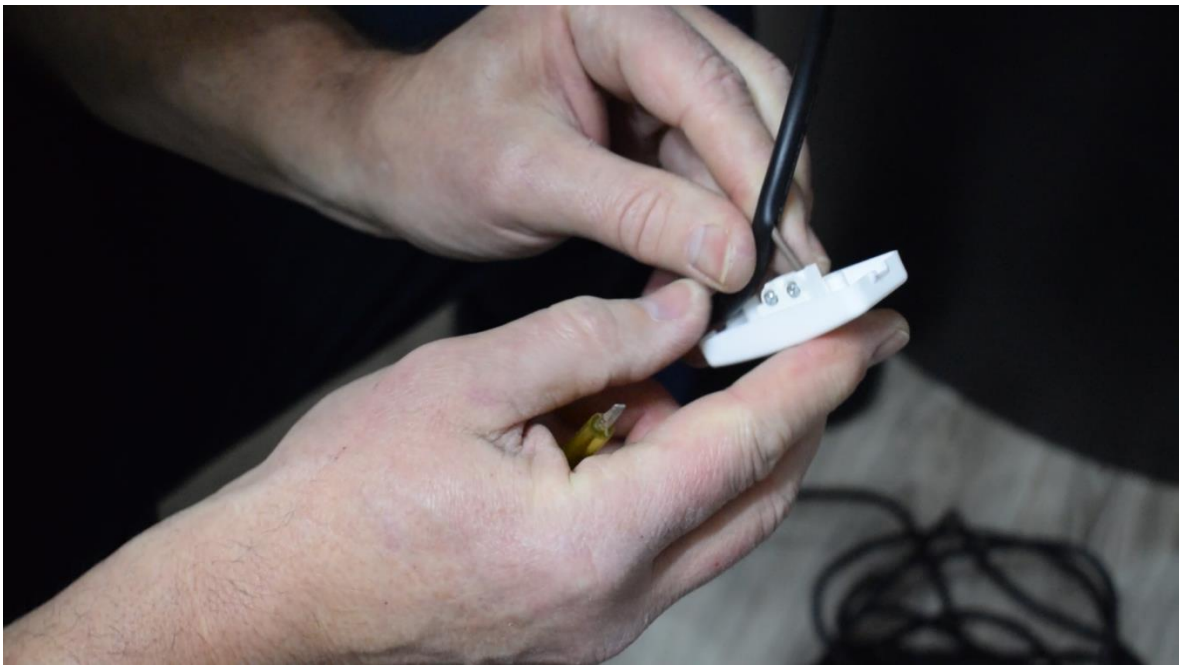
Step 15.

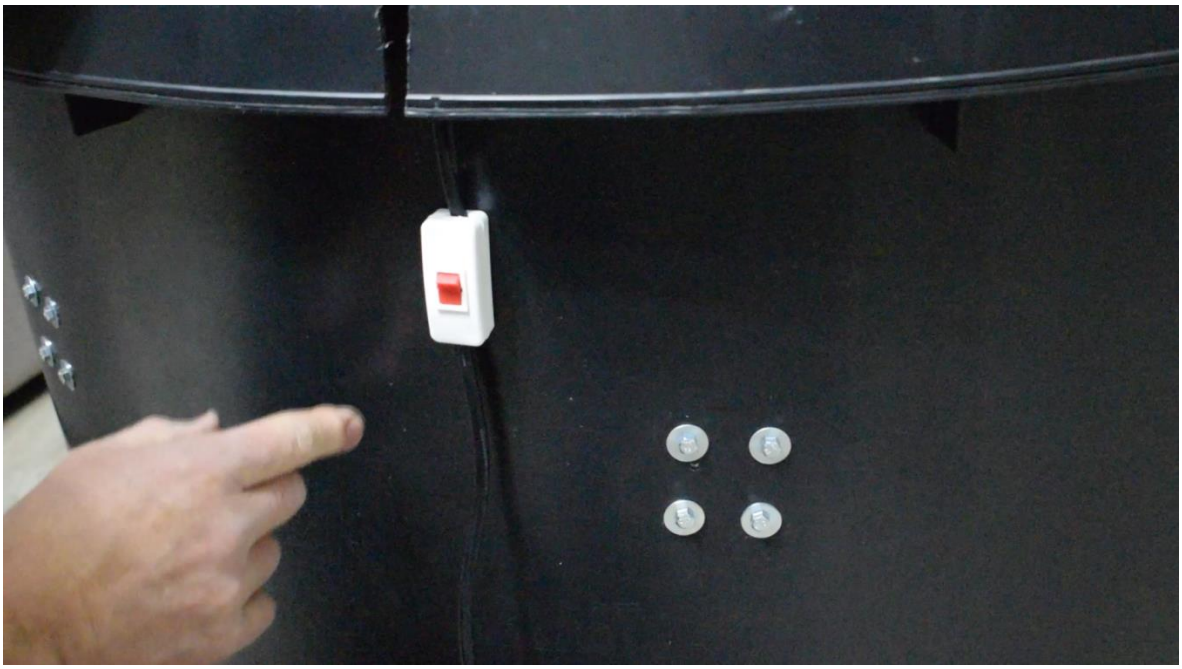
Now for connections!

First you'll need to mount a switch on the power line of the water pump.



You can place this switch wherever you feel comfortable, either in the plastic lid next to the tap or on the side of the barrel. Basic electrical connections are needed. Don't forget to insulate the wires.





We're almost there!

Let me explain the connections again:

The dehumidifier draws moist air in! (Once it's plugged in!)

It condensates and drips in your water tray – in our case the bypass that we have made going through the tube and into the filter.

Next, the filter does its job and filters the water.

The fresh water then accumulates in the sealed lower end of your barrel.

Now, when you need to use the water, you just need to push the ON/OFF switch of the pump.

The pump will draw fresh water from the container and will push it upwards through the tube, goes in through the condensation unit of the dehumidifier and exits fresh and cold on the other side of the dehumidifier and on to the tap.

Voila!

One important thing at this step is that you won't have any leaks, so make sure you seal the connections with either silicone or any other sealant.

Step 16.

Don't forget to double check everything for leaks, to insulate all the wires and make the final tweaks.

There you have it! Just plug your Aqua Tower in and let it generate cool drinking water for you and your family.

Here are some pictures with the finished device doing its job:

YOUR NEW FRESH WATER

A Look On Water In General

What Minerals Are Found Water?

Though it doesn't always look or tastes like anything particularly special, our water is far more nutritional than we might realize.

Although, not even bottled mineral water will supply you with the nutrients your body needs to get by on a day-to-day basis – you'll need to look at your dietary choices to make sure you're getting your recommended daily intake of important minerals.

But drinking 2 liters of water per day can also contribute towards that RDI, some more than others.

Most of us know that calcium and magnesium can be found in water. But did you know that **water contains traces of more than 10 minerals** as well as the well-known? In this section, I'll provide an analysis of the **common minerals found in water** and a quick summary of the public health benefits of drinking them.

Common Minerals Found In Water

Calcium

Calcium, otherwise known as calcium carbonate, is a mineral that can be found in the human body's teeth and bones.

Calcium is the most common mineral in the body and makes up around 2% of the body's weight.

As well as being present in teeth and bones, calcium plays a huge part in many of the body's functions including your vascular and muscular contraction, blood clotting, regulation of enzymes and hormones and carrying messages between the nerves and the brain.

As calcium is involved in almost every process in the human body, a shortage can produce very serious effects. As well as resulting in weaker bones leading to fractures and osteoporosis, a calcium deficiency can also cause convulsions and potentially fatal heart arrhythmias.

Copper

Copper is another of the significant dietary minerals in the body. It works to manage the formation of red blood cells and maintain healthy blood vessels, nerves and bones, as well as support immune function. Getting a high mineral intake of this mineral has even been proven to reduce the risk of osteoporosis and heart disease.

A deficiency in this nutrient can result in a number of issues such as muscle weakness, neurological problems, anemia, and skin paleness.

Fluoride

Fluoride may be found naturally in water in varying amounts, depending on where you live in the U.S or your country. Many states add this mineral to tap water during the drinking water treatment process, as it has proven significant in maintaining dental health and preventing tooth decay.

There's controversy around whether adding even a little fluoride to water is really good for adults and particularly children when consumed on a daily basis, but data suggests that on the whole, it's healthy to drink trace amounts of this mineral.

Iron

Iron is used by the body to produce red blood cells.

Most of us have heard of anemia, which results from an iron deficiency. A lack of this mineral in food and water may also expose you to risks such as impaired immunity, making you more prone to infection and illness. You may also experience problems with the lungs and heart; therefore it's important to make sure you're getting your daily intake of this mineral in the food you eat as well as the water you drink.

Magnesium

Magnesium is another key mineral that is crucial for wellbeing and health.

It plays a part in more than 300 biochemical reactions and is also involved in the development of healthy bones.

A typical human body contains around 25g of magnesium, 60% of which is found in the bones, with the remainder primarily in the soft tissues.

Magnesium levels within the body are very hard to measure because the majority of it resides within the bones. However, a deficiency could cause profound effects including weakness, nausea, and fatigue.

Continued deficiency could lead to numbness, cramps, seizures, personality changes and disruption to the rhythm of the heart.

Getting enough magnesium per day is important for managing multiple tiny biochemical reactions. Alongside calcium, magnesium is also needed for the growth and maintenance of strong bones.

Manganese

Manganese, while only needed in small quantities, is another of the essential minerals we couldn't live without. It supports calcium in the bone-building process, and is also needed for wound healing. Manganese even has an effect on the body's ability to use amino acids and carbohydrates.

Laboratory studies suggest that without manganese, your bones cannot grow as they should.

Phosphorus

Phosphorous is also required for teeth and bones. It also helps the body to use fats and carbohydrates effectively, helps with protein production for the growth and repair of cells, and aids in muscle recovery after a workout. Not getting your recommended daily intake of phosphorus could potentially result in muscle weakness, anemia, and pain in your bones, among other issues.

Potassium

Potassium is involved in muscle contraction, and is also needed for the proper functioning of the nervous system and the regulation of the heartbeat. You might feel really weak or fatigued, have stiff muscles or muscle cramps/aches, or even have concerns with breathing difficulties or

heart palpitations if you don't add the recommended average amount of this nutrient to your diet.

Sodium

Sodium is a nutrient that's needed for helping the muscles and nerves to communicate. Sodium is also required to control the pressure and volume of our blood, and balance our bodies' minerals and water levels.

Zinc

Finally, a stable zinc content in the body can support immune functioning and help to fight off harmful pathogens like viruses. We also need this mineral to make cell DNA and protein, and it is especially imperative for pregnant women, as the fetus relies on zinc for proper development.

Mineral Level By Type Of Drinking Water

As I mentioned earlier, not all sources of water are equal when it comes to mineral intake. Be sure to consider that consumption of certain water sources will offer an increased level of minerals compared to others.

Some of the most *common* drinking water sources to choose from are tap water, mineral water and regular bottled water.

Tap Water

Tap water is, as the name suggests, the water that is supplied to most households in the United States. It travels through the pipes in your home, to your tap, straight to your glass. Most tap water sources are usually derived **from rivers, lakes, surface water and groundwater**, and

will undergo some form of filtration or sterilization at a treatment center before making its way to your home.

Depending on the composition of the rocks and soils in your local area, your **tap water samples will have a higher or lower mineral content**. However, very few tap water samples will have a mineral content that rivals the stuff you can get in a bottle.

Tap water also generally has higher levels of contaminants. EPA regulations limit the concentration of contaminants present in tap water that's sent to our homes, but published data offers evidence that substances like lead, arsenic and chemicals including chlorine might be present in low levels.

Tap water is typically disinfected with chlorine, a chemical that many people would prefer **not to drink** in a source of water because of its known associated health complications.

You can filter the majority of contaminants out of water, significantly improving its quality, with different methods.

Mineral Water

Legally, water from a bottle that's labeled as mineral water must contain a consistent composition of minerals, which usually includes high levels of calcium, magnesium, phosphates and more. This type of water is typically the most "expensive" due to its addition of minerals and is regulated based on standards set by the Food and Drug Administration in the United States.

Most mineral waters are **derived from springs**, and their journey through rocks and soils gives them a **naturally high mineral content**.

However, what makes mineral water superior to the average water source is that additional minerals are added (usually at least 250 parts per million/ milligrams per liter of total dissolved solids – i.e. trace minerals or elements).

Exclusively drinking mineral water **still won't provide you** with all the minerals your body needs, however.

Regular Bottled Water

Regular water from plastic bottles, otherwise labeled as spring water, will usually come from an underground spring – but this water might also come from a well or a different underground aquifer. Spring water contains only the minerals it has naturally picked up from earth, rocks and soils, unlike mineral beverages. No additional types of minerals are added to it, which generally gives it a lower mineral content than mineral-rich water from a bottle.

The Aqua Tower WATER

The Aqua Tower water making process is highly effective and can remove a big amount of trace contaminants from *any source of water*, including spring water and tap water.

Unfortunately, while removing the bad stuff from water, this process can remove the healthy stuff as well – things like trace elements: calcium, magnesium, potassium and phosphorous.

While the human **body can get plenty of these minerals from the food we eat**, it's better if you also drink them.

First let's see what the water making process actually does to the water…well – like I mentioned earlier - it removes **more than 99.9% of all solids that are found in drinking water.**

That means all the harmful impurities found in water, things like chlorine, heavy metals, bacteria, and iron, can all be completely removed, leaving you with **completely pure, impurity-free water.**

But as well as removing a high amount of these unwanted contaminants, the process can also remove the good healthy things your body wants.

For example when water is boiled, anything that can't evaporate into a gas ends up leftover in the boiling chamber – including those essential trace elements.

Luckily, it's not that hard to add the trace elements and minerals back into your water and you can do it at home with very little effort.

You may ask yourself, why don't I just drink the Aqua Tower water as is – since it's pure and free from any impurities?

Well, there are a lot of opinions regarding this subject so let me go ahead and try to make this decision easier for you...

Is The Aqua Tower Water Safe To Drink As Is?

Most types of water, including natural spring water and tap water, contain trace elements, minerals and inorganic compounds.

Generic bottled water, for example, provides about 24 milligrams of calcium, 5 milligrams of sodium and 5 milligrams of magnesium per cup.

Tap water has around 7 milligrams of calcium, 2 milligrams of iron and 9 milligrams of sodium per cup, depending on the source.

The water that comes from the Aqua Tower is **completely pure and impurity-free.** However this water contains none of these minerals.

Think of it as the purest type of water out there. It's free of harmful bacteria, viruses, fungi, sulfate, lead and other contaminants.

The process destroys germs in the water and removes impurities, such as salts and heavy metals.

Boiling and chlorination, by contrast, kill bacteria but fail to remove other contaminants.

The Aqua Tower water contains no impurities and therefore is considered safe. The only downside is its flat taste, because minerals are added to water for taste and since this water contains none, it has no flavor.

Are There Any Health Benefits?

The Aqua Tower water is just as hydrating as regular water. Plus, it has zero calories and it's free of bacteria and heavy metals. Like regular water, the Aqua Tower water supports overall health and wellbeing by keeping you hydrated.

Bottled water, on the other hand, provides more minerals and electrolytes, but it may also contain bacteria and impurities.

A potential advantage of this water is its low sodium content. When consumed in excess, this mineral may raise blood pressure and promote water retention by increasing extracellular fluid volume.

Regular water does contain sodium — but too little to affect your blood pressure or your waistline.

In this chapter, we explore the qualities of the Aqua Tower water as compared with other types of water and analyze whether it is safe and healthful to drink.

What are the potential benefits of drinking WFS water as is?

The WFS water does have potential advantages. These benefits may include:

Cleansing the body with pure water: When drinking this water, a person is consuming water with no other additives. As this water is pure, some people believe it can be cleansing for the body, though data on this is limited.

Reducing the risk of disease: The water making process removes waterborne pathogens. Most waterborne disease-causing bacteria do not survive the water making process.

Reducing risk of consuming harmful chemicals: The United States

Environmental Protection Agency (EPA) does allow for low levels of certain harmful chemicals in drinking water. In the WFS water, none of these chemicals are present.

Each type of water has its own set of benefits, but some do carry risks.

Some people believe drinking this type of water can help cleanse the body from unnecessary chemicals along with other benefits. Other people, however, think the minerals found in drinking water are necessary for good health.

In essence, The Aqua Tower water is not very different from other purified water.

The only thing that differs is the way the water is purified.

The water is safe to drink in moderation as is when combined with a balanced diet. A variety of beverages and soft drinks also contain this type of water.

On the whole, drinking this water is not problematic when combined with other water sources. Most people eat a varied diet in developed countries and get their hydration and nutrition from a variety of sources.

Are There Any Risks Of Drinking ONLY This Type Of Water?

The main risks of drinking only this type of water are associated with the lack of dissolved minerals, such as magnesium and calcium.

Some of the adverse effects of drinking just this type or low mineral water include:

- a flat taste that many people find unappealing, leading to reduced water consumption
- a decrease in the body's metabolic function
- an increase in urine output that could result in electrolyte imbalance
- Failing to replace minerals lost through sweat

When the body loses water through sweating and urine output, it loses sodium and other minerals in addition to water. In order for the body to function properly, those minerals must be replaced.

Drinking this type of water will not replace minerals lost through sweat, since all additives and minerals have been removed during the water making process.

However, as most people eat and drink a variety of food and beverages throughout the day, most people will get the salts and minerals they need from these other sources.

This lack of minerals and additives would only pose a significant risk **if the water was the only fluid or food that a person consumed.**

It is not dangerous to drink this water as part of a balanced diet, which should include foods that replace any minerals lost through sweat.

Now that we have seen the pros and cons of drinking the Aqua Tower Water as is… let's go on and see actually how easy it is to add the trace elements and minerals back into your water.

Water Remineralization

First thing's first, you should know that no matter what, the **existing minerals removed by the water making process** don't *need* to be consumed in liquids.

In fact, food such as fruits and veggies, which you hopefully include in abundance in your diet, contain much higher quantities of these trace minerals.

When you look at the levels of minerals present in drinking water, you can see that in comparison, you're consuming so few minerals from this source that it wouldn't make much of a difference whether you drink normal tap water or purified water from The Aqua Tower.

Benefits of Adding Minerals to Water

Improves Water Taste

If you're a fan of mineral-rich bottled water, you'll know that alkalized water with a high pH has an appealing taste. On the opposite end of the scale, demineralized water with a very low mineral content, or a complete lack of minerals, will taste flat, flavorless and unappealing. Drinking this water with added minerals will raise its pH level and thus improve its overall flavor, bringing some life back into your beverage.

Improves Hydration

If you enjoy something, you're probably going to consume more of it. You're more likely to reach for a glass of water if you like the way it tastes, which is definitely useful from a hydration perspective. One of the most important

factors for human health is hydration of the body, so it goes without saying that we should be drinking plenty of liquids on a daily basis.

General Health Benefits

While water from your faucet doesn't contain the level of minerals the body needs to survive, there's no harm in getting a few extra nutrients from your drinking alone. Nutrients such as calcium and magnesium become increasingly important as we age, and every little helps. Just ensure you're eating plenty of mineral-rich plant foods in your diet rather than solely relying on drinking water with added minerals.

How to Re-mineralize the WFS Water

Which Minerals Should You Add to Your Water?

There are significant health benefits to excluding contaminants and chemicals from unintentional ingestion.

By re-mineralizing the water, it's possible to have the best of both worlds, receiving the valuable protection of the WFS system water but still accessing the health benefits of minerals.

It's fairly easy to re-mineralize the water once you know what to do. The key is to ensure that you only buy quality products to replace the missing minerals; don't be tempted by sub-standard products on sale at the dollar store. By doing this you can continue to enjoy delicious pure water with every health benefit possible.

Here are some easy ways to make your water more alkaline and mineral-rich whether you are at home, at work, or on the go. You may find that a combination of these solutions works best for you.

DIY Water Re-mineralization

Trace Mineral Drops

Looking for an **affordable, low-fuss way to re-mineralize your water**? Mineral or electrolyte drops are an effective solution to consider.

Adding trace mineral drops to your water will make you think you're drinking mineral-rich water from a coveted natural source. You'll actually enjoy your water again, because it tastes so much better. Plus, it's easy to

quickly add a few drops to a glass of water, water bottle, or even a pitcher for the whole family to enjoy.

Trace mineral drops include micro minerals that your body needs in very small amounts, such as chromium, copper, manganese, molybdenum iodine, selenium, iron, and zinc. Many drops also contain a fair share of magnesium, an important macro mineral. Adding minerals to water makes them much more easily absorbed by the body, because they are in their electrolyte or ionic form. You also get the advantage of taking in a steady supply of these minerals as you drink water throughout the day.

A little goes a long way, so make sure to follow instructions carefully to ensure you're only adding what you need.

The Quinton Wellness product is a fantastic solution if you're looking for a product that's been manufactured by a leading wellness company based on decades of medical research.

There are a number of options available on the market today, but not all brands are legitimate, so do your research and don't be so quick to believe a marketing claim.

It's fine to message a company before making a purchase with whatever questions you may have if you're unsure or looking for more data.

Using mineral or electrolyte drops is usually as easy as putting them in a glass or pitcher of water and drinking as you usually would. Plus, they are relatively inexpensive.

Depending on what type of product you go for and the website you buy it from, minerals in the form of drops or electrolyte powder can last for weeks to months, and cost around $20-$40 on average.

Mineral-Rich Salt

This doesn't mean grabbing your table salt and pouring it into your system but instead using a special kind of sea-salt which is very dense in minerals, such as Himalayan sea salt.

Himalayan sea salt contains the full complement of 84 trace minerals and is very cheap to buy. Make sure you purchase fine salt and you won't need to worry about a salty taste in your water.

You can either add a tiny pinch to every glass of water or else add around a quarter of a teaspoon to every gallon of water.

Pink Himalayan Salt

Pink Himalayan salt, a type of sea salt or rock salt, might seem a little strange to add to your water, but it's high in natural minerals while relatively lower in sodium than table salt, making it a useful solution for introducing to your water every day.

Using pink Himalayan salt is one of the most **natural means of water re-mineralization**, but there's a bit more to it than just adding a pinch of the stuff to a cup of water.

The recommended method is to create a beverage called **sole water**, by introducing enough salt to fill a jar 1/4 full before filling it the rest of the way with water. You should then store the water for up to 24 hours to allow the salt to fully dissolve.

Sole water isn't just good for you because of the calcium carbonate and magnesium it contains; the elements found in this type of sea salt are also said to balance the negatively and positively charged ions in the body's cells.

Of course, pink Himalayan sea salt isn't your average table salt, which is far higher in sodium and doesn't contain many minerals at all. You'll need to buy pink Himalayan salt online, where it's widely available. It's important that you're precise with your measurements, here, as though pink Himalayan salt is lower in sodium than other salts, the sodium content could still be dangerously high if you added too much to your water.

By the way, it's an inexpensive solution for adding trace minerals, because two pounds cost well under $10.

Use A Water Bottle That Filters And Infuses Your Water With Ionic Minerals

Want something you can take with you and use anywhere that not only infuses water with ionized minerals, but also filters it once more?

Then check out the *Aqua Sanitas* water bottle with a patented combination of 13 minerals.

The kaolin clay and nano silver helps filter the water. The minerals, negative ion balls, and more give the water a pleasant soft taste.

It's made of surgical steel, comes in a variety of colors, and has a removable filter at the top, which you need to replace once a year, and a mineral disk built into the bottom of the bottle that lasts for five years.

From my understanding, the bottle will soon be retailing in the U.S. for under $100. (For a similar, but much less expensive option, check out the alkaline water flask by *Santevia*)

Use An Alkaline Pitcher To Add Minerals Back In Your Water

You can also use a simple pitcher if you want to raise the pH level and add minerals back in.

There are several alkaline pitchers on the market that offer an easy way on how to re-mineralize your water.

These pitchers change the pH level as well as re-mineralizing the water.

Some designs have built-in clocks that count down to the next filter change, a useful little extra.

Alkalizing Water Pitchers

If you don't want to bother with physically introducing something to your water, an alkalizing pitcher filter may be the best solution for you.

This solution looks like your average water jug or pitcher, but it features a lid with a built-in filter.

When you add water to the top chamber of this jug, it will have to pass through the re-mineralizing filter to enter the bottom chamber, ready for drinking. This enables the filter to add a balanced amount of minerals to your water.

Alkalizing filter **pitchers are really simple to use**, and many people favor them because they require minimal effort to work. They're also

portable, which is a bonus for anyone looking for a re-mineralization option that they can take to work or on vacation.

Keep in mind that you'll have to change the re-mineralization filter once its minerals have depleted. Depending on the product you've gone for, this may require a new filter purchase once after 6 weeks to 3-6 months.

The only issue with alkalizing water pitchers is that you will have to wait a few minutes (usually around 10-20 mins, max) for your water to filter through.

If you want the convenience of a pitcher, you might be interested in the one made by *Santevia* that filters water, raises the pH, and also adds back in calcium, magnesium, and other beneficial minerals. It comes in four fun colors and the filter life is 80 gallons. Plus, the lid has a handy built-in countdown clock so that you know when to change the filter.

It retails for about $59 and the replacement filters come in a 3-pack for $43.99. By the way, the company also makes several other products, such as an alkaline water stick you can add to a water bottle, a stainless steel flask mineral bottle (similar to that described above), and an alkaline reverse osmosis system.

Another option is *pH Restore*. The *pH Restore* jug has some of the longest life filters on the market and is also one of the most effective at raising the pH of your drinking water.

This product is able to remove as much as 99.9% of all contaminants from your water while also increasing the pH level of your water to as high as 10 depending on the quality of your water in your area.

This particular model is moderately priced which means it sits somewhere in the middle between the cheapest and most expensive on this list but I have to admit that I am very impressed with the quality of build, its modern design and the fact that you will be able to enjoy 360 liters of alkaline water per filter.

Alkaline Water Bottles

An even more portable and convenient **on-the-go re-mineralizing solution** is an alkalizing water bottle. These bottles increase water's pH level by adding measured amounts of calcium and magnesium as you drink through the straw.

The obvious benefit of an alkalizing bottled water solution is that it requires no setup. You simply add your water source and drink from the straw as you usually would. Being smaller and more secure than filter pitchers, alkalizing bottles are also the better choice for carrying in a rucksack on hiking trips or in your purse while at work.

As with alkalizing pitchers, you'll have to change the filtering cartridge after 6 weeks or so to get consistent results from this filtration process.

Make Spa Water

Craving water with a little extra flavor in it? Then you may enjoy making your own spa water occasionally. Depending on the fruits, vegetables, spices, and herbs you add to it, spa water offers a nice range of minerals and vitamins, not to mention great health benefits. It's a great substitute for soda and juices. Plus, kids really enjoy spa water, too.

Add A Greens Blend To Your Water

Mixing in an organic greens powder adds minerals, vitamins, and more to your water, so it's a great energy booster.

Now this solution is only a winner if you don't mind drinking green water!

But I wanted to mention it because it makes a powerful energizing drink that is especially great after a long exhausting day. And it won't necessarily taste like algae, because you can get these blends in natural flavors like lemon-lime or berry.

Available in powder form, many manufacturers offer greens powder blends derived from veggies, herbs, grasses, algae, and grains that are not only full of trace minerals and macro minerals, but other goodies like chlorophyll and vitamins, too.

In addition, many blends boast that they provide fiber, prebiotic, probiotic, enzyme, and antioxidants benefits as well. Be sure to read labels carefully to make sure you get what you want as there are many choices.

Use A Ph-Balancing Filter For Your System

Re-mineralizing water can be done at source if you add in an extra filter to your Aqua Tower.

A pH-balancing or re-mineralization filter can usually be added to your system without needing to redesign or change the whole system.

After the water is filtered, some of the minerals are added back; just how much depends on various factors such as flow rate, water temperature and the existing pH level of the water.

Although there is evidence that this can increase the pH level of the water significantly, the level of re-mineralization can vary greatly.

You will need to change the filter occasionally — perhaps twice yearly — and pay around $30 – $50 each time for a new one.

Note: If you're not sure about the pH or hardness (i.e., mineral content) of your water, you can check both using simple test strips. Sometimes you can also get your water tested for free at a pool and spa supply store or a supplier of water filtration systems. By the way, I discovered that calcium is usually easy to test for, but magnesium may require a more complex and expensive test that a lab needs to do.

PRO TIP: The Ultraviolet Light Water Purifier

Ultraviolet water purification is the most effective method for disinfecting bacteria from the water. Ultraviolet (UV) rays penetrate harmful pathogens in your water and destroy illness-causing microorganisms by attacking their genetic core (DNA). This is extremely efficient in eliminating their ability to reproduce. Disinfecting your water with Ultraviolet light is exceptionally simple, effective and environmentally safe. UV systems destroy 99.99% of harmful microorganisms without adding chemicals or changing your water's taste or odor. UV water purification is usually used with other forms of filtration such as reverse osmosis systems or carbon block filters.

Ultraviolet Purification Advantages

- Chemical Free: UV purification does not use any chemicals like chlorine or leave any harmful by products.
- Taste & Odor Free: UV does not add any chemical taste or odor to the water.
- Extremely Effective: One of the most effective ways to kill disease-causing microbes by destroying 99.99%.
- Requires very little energy: Uses about the same energy as it would to run a 60 watt light bulb.
- Low Maintenance: Set and forget type of system, just change UV bulb annually.

Limitations in UV Water Systems

Ultraviolet purification itself is not enough to purify water down to drinking water purposes. This is because the UV radiation is only effective for treating bacteria and viruses. UV light does not work to eliminate contaminants such as chlorine, heavy metals and VOC's (Volatile Organic Compounds). UV systems are often paired with Reverse Osmosis Systems to provide a complete purification process for the safest drinking water.

UV light is a natural process and does not produce harmful chemicals in water. Simply connect at point of entry and plugin in the electricity. It's a safe, effective and environmentally friendly disinfection method that is widely used for residential and industrial applications around the world.

Now you know what's available, take a look at specific products online and see how they've been reviewed by customers and third-party experts in terms of quality. How a product is reviewed can answer a lot of the questions or concerns you may have had about a product's function, effectiveness and value for money.

Always do your own research according to your needs!

Prepare NOW

The biggest enemy of the survivalist may be procrastination. Because there is water flowing from the tap today, it is difficult to even imagine that you could walk into your kitchen or bathroom and turn on the faucet and not see water flowing out. As long as the water is flowing, it is easy to put preparation for a water crisis off until tomorrow or next week. But you know that tomorrow never comes!

After reading this guide, you may feel certain that a water crisis will come, and sooner than most think, but you may feel overwhelmed when you think about all that must be done to prepare. You may feel anxiety over how you can possibly find the time or bear the expense of preparing for an emergency. Your schedule is already tight and you would prefer to do other things than plan and prepare for an emergency. That is understandable! However, you must remind yourself that preparation can only take place

before an emergency happens. Once the emergency is upon you and your family, there will be no time or resources for preparing and it will have an impact on your survival and day-to-day living. Now is the time to prepare so that you *can* survive, make the impact of the emergency as light as possible, and avoid the pitfalls that create terrible scenarios during a time of emergency.

As is true with most big projects, it's best not to view your preparation tasks and purchases as one big project. Instead, break the bigger plan into smaller tasks and work on the tasks one at a time. It is better to start small and accomplish a small part of your preparation plan than to worry about the big plan and not start and accomplish anything at all.

Who Should Prepare for a Water Emergency?

Who should prepare for an emergency? The simple answer is *everyone*. Some people will be naturally more positioned to endure a water emergency without as much preparation. Others would be completely without any water and unable to survive if an emergency were to happen right now. But *everyone* should be prepared with a backup supply of stored water and a plan in place for sourcing, filtering, and purifying water. This includes community organizations and businesses such as schools, places of worship, colleges, assisted living facilities, group homes, daycare facilities, and any place where people gather and could become stuck there if there were a sudden emergency.

Now is the time to talk with neighbors, co-workers, church members, extended family members, civil servants, local business owners, and local

organizations to help create a community effort to prepare for a water crisis.

How to Begin Preparation

Being prepared for a water crisis begins with gathering a supply of stored water. It's important to base this supply on having one gallon of water per person per day. You should start with gathering a three-day supply for each person, extending your goal to store a two or three-week supply or more. However, you always want to keep in mind that if there is a long-term water shortage such as during a HEMP attack, you will not be able to amass enough water to last through the crisis that could impact water sources and electricity for months or even years.

For a longer-term water supply preparation, you must have a plan that you can implement if your stored water runs out or if you think it will run out before the crisis ends. This means you should know how to use the hidden water in your home and on your property, including where the water shut-off valve is located to prevent contaminated water from getting into your house plumbing.

You must also know where you can find natural sources of water that you and your family can get to and transport (if needed) even if your vehicles do not run due to EMP or because there is no gasoline. Since the natural water sources may be contaminated, it's important that you know what water filtration and purification methods can be used, as well as have supplies and equipment for filtering and purifying water. The time for purchasing and testing the filtering and purification systems and methods is now,

before you have to depend on them for survival. You should also educate yourself and your family on how to create an impromptu emergency filtration and purification system for water. Part of your water preparation plan should also be to set up a system for rainwater collection, particularly if you live in an area where you can count on consistent rainfall for water during certain times of the year.

It is not only the adults in the family that need to be educated on surviving a water crisis. It is a terrible thought, but it is quite possible that parents and children could become separated during an emergency. You do not want to frighten young children, but you want them to understand what a water crisis is, how it could happen, and why you need to be prepared. Of course, you want your teens and children to be empowered with the knowledge to take care of themselves if necessary and to be as prepared as possible if you are separated from them. Teens and children should know where the stored water is kept and where the key to the storage is if there is one, how to assemble and use water filtration and purification systems, what water is safe to drink and what water they should never drink. They should have a clear understanding of how to access hidden water in the house and on the property, and how to ration it appropriately to maintain health without wasting water.

Set weekly meetings for your family to come together to learn and discuss your water emergency plan. Young children learn best through repetition. Do not show them a filtration method once and expect them to remember it. Show them every week until you are certain that they understand. Then let them demonstrate it for you. Gently correct them if they make mistakes

that could waste water or cause them to drink unsafe water during a real water crisis situation.

In your weekly meetings, act out scenarios and ask the children what they would do in such a scenario. Children remember information when all of their senses are engaged in learning the information. You can create board games and action games that incorporate survival questions that the children must answer or demonstrate in order to progress in the game or "win" the game.

Another way to educate your children about surviving a water emergency is to create flashcards that help them memorize the information they need to know. When the family is riding together in the car may be a good time to take out the flashcards and work on memorizing information such as how to purify water, where hidden water can be found in the house in an emergency, and where the stored water is located.

Preparing for a power outage should also be part of your plan as it is quite possible that the water crisis will be simultaneous with a power outage. Both EMPs and severe natural disasters could lead to a power outage that lasts anywhere from a few hours to several days. Always keep accessible emergency electricity outage supplies such as candles, flashlights with extra batteries, portable/alternative cooking heat source, and alternative source for heating at least one room of the house where everyone can gather to stay warm. Make sure at least one of your methods for water filtration and purification do not require electricity such as the Berkey water filter that relies on gravity.

If you overwhelmed about equipment for surviving an emergency, budget so much per month to purchase a new survival item. In just a few months,

you will have most of what you need. You may also look for some survival equipment at garage sales or on Craigslist.org. However, it is not advisable to buy a used water filter. Look around your house and see what you have that can be used or repurposed into much-needed survival equipment. You will be amazed at what you can do with very little when you are creative!

If you want to purchase expensive survival equipment such as a generator, tanks of gasoline or propane, etc., talk to trusted family members, friends, or neighbors about sharing the expense and the equipment.

When you make your purchases, purchase the most important items first. Your water storage should be first item on the list, with your water filtration and purification system next on the list. Of course your food stock is a priority, but remember that you can survive longer without food than you can without water, and food may be more accessible in an emergency than water.

Do not be anxious about preparing for a water emergency. People all across the United States are right there with you. You live in a time when the best water filters and emergency equipment is available and when there is excellent information on how to prepare, such as this guide. The key to preparation is to start now! Let your desire to protect yourself and your family serve as a driving motivation to start preparing now instead of procrastinating. There will come a time when you will be extremely glad that you did not procrastinate!

Where to Find The Parts And Tools – Quick Online Buy Guide:

We have assembled a list with all the parts and tools and where to find them. Please keep in mind that the list below represents our view on the project. If you would like to invest more and builde your Aqua Tower even more efficient and robust, obviously the costs will go up.

1. **Dehumidifier** – this one is a good value for money:

https://www.walmart.com/ip/Keystone-70-Pint-Dehumidifier/180896539

2. **Water Dispenser** –
https://www.amazon.com/Saqua-Water-Purification-Dispenser-System/dp/B079Y46X7T
3. **Cabin Air Filter** – here's a good one to use for your project:

https://www.amazon.com/EPAuto-CF10285-Toyota-Premium-Activated/dp/B014TYRQUY/ref=sr_1_1_sspa?keywords=cabin+air+filter&qid=1551797779&s=gateway&sr=8-1-spons&psc=1

4. **Water Filter Tap –**

https://www.amazon.com/dp/B072FNRNXW/ref=sspa_dk_detail_1?psc=1&pd_rd_i=B072FNRNXW&pd_rd_w=xIe5Y&pf_rd_p=80559f3c-f83b-49c1-8a72-

40f936e9df7a&pd_rd_wg=vIKgt&pf_rd_r=NTQYEB6APMW2AC55MZX7&pd_rd_r=369db34a-3f57-11e9-99fe-937f2c1eb4e1

5. **Submersible Water Pump –**

https://www.amazon.com/VicTsing-Submersible-Aquarium-Fountain-Hydroponics/dp/B00EWENKXO/ref=sr_1_5?keywords=Submersible+Water+Pump&qid=1551798004&s=home-garden&sr=1-5

6. **AC ON/OFF Switch –**

https://www.amazon.com/Magic-shell-2-Pack-Rocker-Position/dp/B07D27W6X7/ref=sr_1_3_sspa?keywords=AC+ON%2FOFF+Switch&qid=1551798067&s=gateway&sr=8-3-spons&psc=1

7. **Vinyl Tubing –**

https://www.amazon.com/TotalPond-Vinyl-Tubing-1-2-inch/dp/B004DL0Y9O/ref=sr_1_4?crid=3CKWSIW207NM6&keywords=vinyl+tubing&qid=1551799666&s=gateway&sprefix=vynil+tub%2Caps%2C271&sr=8-4

https://www.amazon.com/50-Feet-Multipurpose-Kegerator-Aquaponics/dp/B07CPMS5MQ/ref=sr_1_11_sspa?crid=3CKWSIW207NM6&keywords=vinyl+tubing&qid=1551799738&s=gateway&sprefix=vynil+tub%2Caps%2C271&sr=8-11-spons&psc=1

8. **Electric Cable –**

https://www.ebay.com/itm/Equipment-Wire-Stranded-Copper-Cores-Muti-18AWG-28AWG-Cable-DIY-Electrical-Wire/400801724991?hash=item5d51a4fa3f:m:mo5CwnD8ZY0zNfOvMADSw7w&frcectupt=true

9. **Water Barrel** – here is a good example that you can use:

https://www.ebay.com/itm/200-LITRE-BLACK-WATER-BUTT-WITH-STAND-TAP-LID/220944642676?epid=1188233804&hash=item337153b274:g:WWQAAOSw48dbHYtX:rk:3:pf:1&frcectupt=true

10. **Round Plywo**od – this depends on the inner diameter of your water barrel. Here's a seller that provides multiple dimensions and thicknesses:

https://www.ebay.com/itm/Round-plywood-circle-cut-to-size-table-desk-birch-bonded-hardwood-solid-panel/253320314037?hash=item3afb113cb5:m:m8V3B_xnLQTqw75aNHjPQXg

11. **Metal Corner Brackets** – You can find plenty of sizes on Amazon. Here's a suggestion:

https://www.amazon.com/Arks-Royal-Corner-Brackets-Fastener/dp/B076DHYWYV/ref=sr_1_46?keywords=Metal+L-Shaped+Corner+Brackets&qid=1551800947&s=gateway&sr=8-46

12. **Nuts and Bolts –**

https://www.amazon.com/Bolts-Nuts-Washer-Assortment-Pieces/dp/B019PXB6Z0/ref=sr_1_4?keywords=Nuts+and+Bolts&qid=1551801036&s=gateway&sr=8-4

13. **DUPONT AIR FILTER-**

https://www.walmart.com/ip/20x25x1-Dupont-High-Allergen-Care-MERV-11-Air-Filters-2-Pack/847073293