



# NWO Well Services Ltd

*Honesty, Experience, Quality*

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## CHLORINE AND DISINFECTING WELLS AND WATER SYSTEMS

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The following was prepared by Brett MacAskill of NWO Well Services Ltd, for use by Northwestern Ontario well owners, and it is based off of his experience working on wells in the region. It may be applicable to other areas, but you should check with your local experts before you use chlorine in your well.

**After reading this article it is my hope that you will gain a better understanding of:**

- Why chlorine (bleach) is effective and safe
- How a disinfection routine is achieved
- Why a homeowner probably should never do this, and why it is cost effective to have us do it
- Common myths
- Common examples of “experts giving bad advice”

**Why chlorine (bleach) is effective and safe:**

Chlorine kills bacteria, viruses, and some protozoa, the three biological dangers of drinking water. Chlorine is relatively inexpensive means of water treatment. Chlorine, when applied at certain concentrations in your well water, will form a mild hypochlorous acid that is effective at destroying the proteins that bacteria need to live. It also kills viruses relatively well, but I have never found a solid explanation why. Chlorine is weakly effective at killing some protozoa, but unfortunately not *Cryptosporidium*.

The amount of chlorine you would have to drink to become ill is beyond the palatable tolerance of chlorine, that is to say, the taste and smell would so strong that no mentally stable person with working taste buds, olfactory senses, and dermal nerve endings could drink it. Soldiers have been known to drink 50ppm concentrations of chlorine for long durations with no known long term health concerns. To put that in perspective the average concentration of chlorine in tap water is between 0.5 and 2.0ppm. It is safe to assume that if you can handle the taste the concentration level is safe to drink.

**How a disinfection routine is achieved:**

When used correctly, chlorine is an incredibly effective and inexpensive means of disinfecting a well, as well as your whole water system. When we are treating for a problem, we begin by measuring the characteristics of the water as needed, which include volume, recovery rate, pH, temperature, and alkalinity. We then prepare a dose with the intention of reaching either a 75-200 ppm concentration in the well for biological treatments, or 400-500ppm for chemical treatments.

If we achieve the required concentration we will then dump a small amount of the solution from the well as needed to clear up the water prior to letting it into the house, as chemical reactions with certain minerals in the water or the surface

of the well can cause a small portion of the initial water to be extremely discoloured, murky, or silty. If the concentration is too low we will apply a second dose as appropriate and remeasure. If the concentration is too high we may wait until the concentration achieve the correct level, add water, or safely purge the volume of the well and start over. We always agitate the well column at this stage, to both speed up the process and ensure all parts of the water column are equally concentrated. Once the concentration is correct and the solution appears relatively clear, we will then pump it through the entire household plumbing, checking concentration at all taps, showerheads, and other fixtures where human consumption may occur.

We will then wait 12 to 24 hours, which allows enough time that the chlorine can do its work. We re-test at this point to ensure that the concentration remained as high as required the entire length of treatment. If the concentration is correct we will purge the well first, and then the house plumbing, in order to ensure that every fixture is clear of the treatment solution. If the concentration is below the required level, we will have to start over - this is a rare occurrence in our region but it can occur due to unforeseen subsurface geological and hydrogeological conditions.

For a biological problem, once the treatment solution is purged we will run the pump for ten minutes, and take samples to a local lab for testing to ensure that the pathogens that prompted our work are now gone.

### **Why a homeowner probably should never do this, and why it is cost effective to have us do it:**

Unfortunately, as the above paragraphs are intended to show treating with chlorine is not simple or easy. Dumping a unknown concentration of chlorine into an unknown volume of water, moving at an unknown rate is most likely wasteful, probably ineffective, and potentially dangerous.

You should never proceed with chlorination on your own if:

- You don't know the concentration of chlorine that you are using
- You don't know how the chlorine was stored before you received it, or if you stored it in the sun.
- You don't know the characteristics of your well and water system, such as total volume and recovery rate
- You don't know the chemistry of your water, such as the pH, the temperature, or the alkalinity
- You have no means of measuring out a specific dosage of chlorine
- You have no means of measuring the effectiveness of the dosage on both the water and the pathogens

We treat dozens of wells every year, which means that we have pricing arrangements with the local labs and chlorine suppliers, we have the proper equipment and materials, our chlorine is stored correctly, and our staff not only have the training needed to do this work but just as importantly have the experience to quickly notice, react to, and resolve the multitude of problems that can be present or arise during a chlorination routine.

The way I see it is, you can hire us to do it at a cost of several hundred dollars, you can do it yourself properly at a cost significantly higher than our price (as you will need to purchase tools and materials you may never use again, not to mention the time you spend learning how to treat with chlorine), or you can do it yourself improperly (and thereby throw your time and money because there is no real gain, you haven't fixed anything, and may even made it worse).

If your budget is the reason you do not want to hire a professional, we can provide interest free payment plans, and we do accept Visa and Mastercard. We will always do our best to accommodate your situation. Don't risk your health over a few hundred dollars.

If you insist on doing a treatment on your own, please keep in mind when working with chlorine:

- You should always follow safety precautions (safety glasses, gloves, and work in a ventilated area) and follow all manufacturer's directions when working with chlorine products (read the label and refer to the material safety data sheet).
- You should never mix ammonia products with chlorine products. This could harm or kill you and others. Chlorine and ammonia, when mixed produce chlorine gas - which can be fatal.

- Always add the chlorine products to water, not water to the chlorine products.
- During the treatment ensure that the chlorinated water is not used or consumed.
- Do not use chlorine products that are expired, nor products that are known or suspected to have been exposed to sunlight for long durations. Chlorine products have a shelf life and unfortunately will break down even more rapidly than the expiry date indicates when exposed to sunlight.

## Common myths

- *“Bleach (chlorine) does not expire”* - it actually loses concentration over time, especially when exposed to extreme weather and sunlight.
- *“Bleach (chlorine) will work for water treatment”* - these products often contain additional chemicals that can harm you or cause other issues.
- *“Pool chlorine works for water treatment”* - these products often contain additional chemicals that can harm you or cause other issues.
- *“You just need to dump it (bleach) in and then pump everything out”* - without measuring and controlling what you are doing it is unlikely that you will achieve anything positive, the purged water can kill grass and plant, and the uncontrolled chemical reactions that may occur in your well and water system can be very expensive to fix.
- *“Before you sell your house you should dump in a couple bottles of bleach so that the buyer’s test will pass”* - not only is this likely fraud, but you could actually harm the seller’s health by not allowing for a true test of the water quality. If you have concerns about your well, and you intend to sell, have us come out and take a look and get things up to standard - you can then confidently value your well and sell your property.
- *“When you have been away from home/cottage for a long time, or you are starting to use a new or an old well for the first time you should first treat it by dumping some bleach down the well”* - please don’t do this, you are likely only making problems for yourself. What you should do it run the water until it is clear, or until 20 minutes passes, it might be murky for a while but it should clear up. If it does not clear up within 20 minutes you should contact us so we can assess the issue.
- *“The health unit has issued an overland flooding advisory concerning your well and they or someone else implies that a quick treatment will protect you”* - this is simply not true, and it may cause more problems. These situations are always complex, please contact us if you are in one of these areas and we can explain in detail what you should do based on your well’s location, type, and characteristics. No matter what you do decide to do, you should be testing your well weekly in these situations, and cease consuming the water if any taste or discolouring changes occur.
- *“You have a bad bacteria sample report, and someone tells you to simply dump some javex into ...”* - there is nothing simple about these situations, please call us or another well contractor, we will save you time, money, and possibly harm. Occasionally a single treatment is all that you need, but more often than not this is not the case. Most wells don’t need “periodic cleaning”, if the structure has failed it will need to be fixed, if a source is contaminated it will need to be shut off, if your plumbing has dead-ends or other issues it will need to be fixed, no amount of chlorine or treatments is going to fix these situations.

This document has been prepared by Brett MacAskill, a licensed well technician with NWO Well Services, and posted on NWO Well Services website.

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