

# YOUR PRIVATE DRINKING WATER SUPPLY

## What kind of health risks might arise from a private drinking water supply?

Water from rainwater tanks or deep bores is usually very palatable. However, it can sometimes be contaminated by human, bird or animal faeces, usually from leaking septic tanks, wastewater drainage or bird or possum droppings on roofs. Irrigation channels and local streams may also be contaminated by runoff washed from farmyards, pastures and drains, making them generally unsuitable as a source of drinking water unless the water is properly treated.

Contaminated water may contain harmful micro-organisms, such as viruses, bacteria (such as *Salmonella* or *Campylobacter*) and gastro-intestinal parasites (such as *Giardia* or *Cryptosporidium*). These harmful micro-organisms (pathogens) are not visible to the naked eye and may even be present in relatively clear water.

Drinking water containing these micro-organisms can cause severe gastro-enteritis, possibly lasting for several weeks. Infants, the elderly and people with suppressed immune systems are most likely to be affected. Your guests may also become ill if they drink contaminated water. However, the risk of contracting these illnesses from water can be very greatly reduced by obtaining your drinking water from a clean, good quality source, such as rainwater, and regularly maintaining your water supply system.

## What about risks from chemicals?

Chemical contaminants are usually less common than microbiological contaminants, but they can still be present in the rural environment. For example, soil from old industrial, mining or agricultural areas may contain arsenic, heavy metals, pesticide residues or other chemicals. If dust is blown onto your roof and is washed into your rainwater tank, chemical residues may build up in the water. Runoff from roofs in urban or industrial areas may also contain chemical pollutants from the air.

Lead-based paints or flashing used on some older roofs may also flake off and be washed into rainwater tanks. Tar-based coatings can bind other harmful organic chemicals (such as pesticides) to the roof surface and also make it difficult to clean. Harmful smoky residues from solid wood heaters can also condense near flues on your roof. These chemicals may leach from the roof surface over time and may be washed into your rainwater tank.

Aerial application of fertilisers and pesticides (i.e. >crop dusting=) can sometimes result in these agricultural chemicals entering rainwater tanks. Agricultural chemicals may also drift or be washed into drains, irrigation channels, local streams and dams.

## How can I make sure that my water is safe to drink?

The following simple precautionary measures can significantly reduce the likelihood of harmful micro-organisms or chemicals being a problem in your water supply.

- Collect and store your water so that contamination from human, chemical or animal sources is minimised. If possible, store drinking water in an above-ground tank rather than in an underground tank.
- Ensure that surface runoff, channel water, irrigation water, leakage from sewer pipes, sullage drainage or shallow underground seepage cannot enter your drinking water supply.
- Make sure any deep bore used as a source of drinking water is properly cased, with an above ground well-head.
- Do not collect water for drinking from recently painted roofs, timber roofs preserved with chemicals, roofs coated with lead-based paints or tar-based coatings, or parts of roofs near flues from solid wood heaters. Most other roof types will normally be safe for water collection, provided they are kept clean.
- Regularly clean your roof and gutter to remove leaves, animal or bird remains, dust and other debris. Install simple screens between your roof and the water tank.
- The first rainfall after a dry period usually collects most of the contaminants on your roof. Installing a >first flush= or other diversion system will prevent this water from entering your water tank. This >first flush= water can be stored separately and used for yard washing, garden watering or fire fighting.
- If your house is oversprayed by aerial chemical spraying, divert the collection pipe from your rainwater tank to prevent any pesticides from entering the tank. Clean the roof or wait until after the next rainfall before reconnecting your drinking water tank to your roof.
- Seal your water tank so that insects, small animals, birds and sunlight can not enter (this will also help to minimise the growth of algae).

- Regularly maintain your water tank and clean out accumulated sludge from the floor.
- Ensure that your domestic drinking water plumbing is completely separate from all other plumbing or pipe systems on your property and that all pipe joints are properly sealed.
- Disinfect your water supply to kill any harmful micro-organisms.

## Do I need to filter my water?

In general, water that is turbid or dirty, such as that from dams, irrigation channels or some rivers, will not be suitable for drinking unless it is properly treated. Dirt that is present in the water can protect harmful micro-organisms from disinfection. Dirt can also generate an unpleasant taste, provide nutrients for algae growth and make washing difficult. Many different forms of treatment are available for water from these sources. However, it is usually more economical to obtain your water from a good quality source than to treat poor quality water to a standard where it is safe to drink.

If you wish to connect a domestic water filter to your kitchen tap or other in-house drinking water supply, you should first check that the filter complies with Australian Standards. Be sure to carefully read and follow the filter's maintenance instructions.

## Do I need to disinfect my water?

In most rural areas, rainwater collected from a clean roof and securely piped into a well-maintained above-ground tank should not need to be disinfected. However, if your water supply has become contaminated with harmful micro-organisms, you should disinfect it before using it for drinking, food preparation or making ice. People with suppressed immune systems should only consume water that has been boiled.

You can disinfect your water supply by bringing the water to a rolling boil for around one minute, then allowing it to cool and storing it in your refrigerator until needed. Otherwise, adding small quantities of chlorine to your water supply is usually the cheapest and most effective means of disinfection.

Groundwater obtained from a shallow bore should be disinfected, in case the bore has been contaminated with farm waste or leaking effluent from a septic tank. Groundwater from cased deep bores should not need to be disinfected, but may be salty. If in doubt, check with your local bore supplier.

Where water is pumped from a dam, river or creek, and you are satisfied that it is not too turbid or dirty, you can add liquid chlorine (sodium hypochlorite) using an injection pump to deliver a set dose of chlorine when the water pump is operating. If water is pumped into tanks intermittently, you can add chlorine manually during or after filling.

Ultraviolet disinfection can also be used, but this requires very clear water and must be very carefully designed and operated. This method initially disinfects the water but does not provide any ongoing protection.

## How much chlorine should I add?

If you are disinfecting your water, enough chlorine should be added to provide a free chlorine residual of around 0.5 parts per million (0.5 milligrams per litre) after 30 minutes. As a general guide, an initial dose of 5 parts per million (5 milligrams per litre) of chlorine will provide this residual. You can test this with a swimming pool test kit or dip strips, obtainable from your local pool shop. Any chlorine smell and taste in the water will dissipate after a short time.

## How much chlorine is needed for the initial dose of 5 parts per million (5 mg/L)?

Firstly, work out the volume of water in your tank in kilolitres. ▢ For a cylindrical tank,

- Volume of water (in kilolitres) =  $D \times D \times H \times 0.785$ ,  
where D = diameter of the tank (in metres), and H = depth of water in the tank (in metres)

(To check your calculation, compare this volume with the maximum capacity of your tank).

- For every kilolitre (1,000 litres) of water in your tank, add either:  
40 mL of liquid pool chlorine (sodium hypochlorite ▢ 12.5% available chlorine); or  
125 mL of plain (unscented) household-grade bleach (4% available chlorine); or  
8 grams of granular pool chlorine (calcium hypochlorite ▢ 65% available chlorine).

Be sure to read and follow safety and handling instructions on all chlorine or bleach containers, especially for granular pool chlorine. For your protection, you should wear proper hand and eye protection when handling or preparing chlorine solutions. If you use a metering pump to add chlorine, you will need to adjust the injection rate to suit the flow. Follow the instructions on the pump or obtain advice from the pump manufacturer. Remember to allow 24 hours after the initial dose for the chlorine to disinfect the tank before you drink the water. Chlorine is heavier than water, so it will tend to sink towards the bottom of the tank.

## What should I do if I find a dead possum or bird in my tank?

A dead animal in your tank will not necessarily cause illness if you drink the water, but it is best to drain all water from the tank as a precaution. Wash out any sludge from your tank, repair any holes in the roof and scrub the interior with a household bleach solution. Remember to maintain good ventilation whenever you are cleaning out any tank and always work with an assistant outside the tank. It is best to re-fill your tank with good quality water and disinfect it with chlorine to 5 ppm (5 mg/L). If good quality water is in short supply and it is not practicable to drain and refill the tank, you should boil any water you intend to use for drinking, food preparation or making ice.

## What other problems might affect my water supply?

- Groundwater may contain high levels of nitrates, which pose a special risk to bottle-fed infants. If you are considering using groundwater to prepare formula for your baby, please first consult your maternal and child health nurse or family doctor.
- Algae can grow in dams, rivers and unroofed water tanks and may form scums or cause taste and odour problems, even at quite low levels. Blue-green algae may also be very toxic to humans, domestic pets and stock. Toxins from these algae are NOT destroyed by boiling or disinfection.
- Mosquitoes can breed in water tanks, causing a nuisance near the tank. Screening the tank inlets and overflow with fine mesh is the best option.
- Zinc from a newly galvanised tank may impart an unpleasant metallic taste to the water for a while but is not harmful.
- Water pH tends to rise when stored in new concrete tanks, due to the leaching of lime from the concrete surface. These tanks may need to be flushed before their first use.

Remember to consult the installer or manufacturer of any bores, roofing material, tank systems or ancillary equipment on your property for any specific advice you may need. Pipes and water tanks should meet Australian Standards relating to materials in contact with drinking water.

## Where can I get further information?

- The Victorian Department of Natural Resources and Environment has a wide range of free publications about water quality, bore water supplies, toxic algae, fire safety and rural land management. Contact their Customer Service Centre on 136 186 for copies, or visit their regional information centres or website.
- More detailed information about planning, installing and using rainwater tanks can be found in the monograph >Guidance on the use of rainwater tanks=, published by National Environmental Health Forum in 1998 (ISBN 0 642 320160). This can be purchased from the South Australian Department of Human Services, on (08) 8226 7100.
- Your municipal council=s environmental health officer can advise you on environmental issues and building or planning regulations associated with water tanks in your area.
- If you have any queries about your health or the effect on your health of drinking from a particular water supply, please consult your family doctor.
- If you would like to find out more about drinking water quality in Australia, visit the Co-operative Research Centre for Water Quality and Treatment's website.

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**Published April 2000 by Public Health Division of Victorian Department of Human Services**