

PRAIRIE Water News

...dedicated to protecting and improving rural water supplies

Availability of Copper Sulphate Products in Western Canada

By Serena McIver,
Water Quality Engineer, PFRA

Algae and aquatic plant growth are common problems in farm dugouts or ponds and result from a combination of factors including heat, sunlight and high nutrient levels (from natural and/or introduced sources). Controlling algal growth is important as certain types of blue-green algae, or cyanobacteria, can produce deadly toxins. The most common water treatment to control cyanobacteria is properly timed and properly dosed treatments of copper sulphate. The most common copper sulphate product is often called

bluestone.

Over the past year, there have been an increasing number of inquiries on the availability of copper sulphate products in western Canada. Many retailers of copper sulphate were unable to obtain supplies of the product this year, making it difficult for producers to access them in the marketplace.

As of 2003, Health Canada's Pest Management Regulatory Agency (PMRA) requires pesticide registration for all products sold or used in Canada as an algaecide to control plant growth in ponds and dugouts. This requirement has led to a diminished supply of copper products as some manufacturers chose not to seek registration of their products with PMRA and withdrew their products from the Canadian market.

However, a number of registered granular and liquid copper-based formulations still exist in the Canadian market. These products will be very similar to the products that were used in the past, but may not be as readily available and may be more expensive than the former copper sulphate products. It will be important to keep checking with your local agro-centre over the winter months as these retailers continue to locate new manufacturers of copper-based products for the upcoming season.



Applying Copper Sulphate

Whichever product you choose to use, it is important to apply it in accordance with the product labelling. The labelling will specify restrictions both to protect the environment, and to ensure that the treated water is safe for its intended use (irrigation, livestock watering, domestic water, drinking water).

Copper treatments are short-term measures to problems with cyanobacteria, therefore the key to improving and maintaining good water quality lies in the appropriate management of the entire watershed. This can be accomplished by good land stewardship and implementation of appropriate best management practices which will protect the water and prevent excess nutrients from entering the water. As well, non-chemical means can be used to enhance water supplies, which includes well-designed, continuous, year-round diffused aeration.

For more information, please contact your local provincial farm water specialist or regional PFRA office.

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Developing an Adequate Water Source

*Taken from Water Wells
That Last for Generations
Alberta Agriculture Food*

Often little thought and foresight is given to planning a farm or home water system. On the surface, a water system seems no more than an automatic pump and storage tank that delivers water under pressure to the household. There are other important aspects, such as how much water is available, the pressure, water quality and provisions for watering a garden and fire fighting. When planning a water system, consider all the uses of water in your home and business.

Include such things as:

- Livestock watering
- Cleaning barn floors and equipment
- Irrigation of gardens and greenhouses
- Egg and milk production
- Fire protection.

A water system that is well planned and designed costs more initially but

saves money in the end. Costly changes to correct errors are reduced and you have a convenient and reliable water supply, provided you properly monitor and maintain the system.

There are several steps to planning your water system:

- Determine water requirements
- Complete an inventory of water sources.

The first step to planning is to determine your water requirements. Look beyond your current requirements and consider any changes you may be making in the next few years. For example, is another family moving to the farm? Are you considering diversifying to include a market garden? A well-planned water system should also have a backup or second water source in case of pump or water source failure. Water sources that can easily be connected using underground piping provide the flexibility required in emergencies.

The next step to planning is to complete an inventory of all existing well and surface water sources. Record production rates, storage volumes and any previous problems with water quantity or quality for each water source. Completing an inventory will show if there is adequate water supply to meet your needs year round. If you have some doubt about the adequacy of your existing water sources, take time to check all the options before choosing to drill a new well. There may be inexpensive ways of increasing well yields or water storage to meet your needs. In some situations a well can comfortably keep up to daily requirements but not peak demands. The addition of a cistern with one-

half to one day storage may be all that is required.

Water wells are generally the first choice of Albertans wherever there is an adequate supply of good groundwater. In areas of marginal groundwater supply, livestock operations often use a combination of wells and dugouts. The better quality water from the well supplies the household and supplements the livestock's requirements. For most household situations, wells with a production rate of less than 5 gallons per minute (gpm) for a one hour (peak use) period do not supply enough water so it is usually necessary to create additional water storage using a tank or cistern. Wells that produce at a 5-10 gpm rate usually do not require additional storage.

When a lot of demand is placed on the well at any given time, such as on a farm, it should be capable of providing a minimum of 10 gpm for at least 2 continuous hours. If the flow rate of the well falls short of this amount, a cistern is usually the best option for providing water storage, to overcome the shortage of water. For livestock operations, a well should be capable of providing all of the water requirements in an 8 to 12 hour period.

In areas where there is a combination of either poor groundwater supply or quality, dugouts may be used exclusively, or in combination with a well, as a water source. If you need to rely solely on a dugout for your water, size the dugout for a two to three year supply. When you plan the dugout, be sure to:

- Locate the dugout upstream of any livestock areas



Well Drilling

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- Fence the dugout
- Install a pumping system with a floating intake
- Aerate.

If you have a well and dugout, use the well water for household use because it is typically of better quality. Dugouts can provide a good quality water source for livestock and irrigation purposes. Check dugout water quality and be aware of risks of algae, etc.

No matter the water source, do the following to protect your water supply:

- Test the water quality regularly
- Treat the water if necessary
- Monitor the supply and water level
- Maintain the well and water system
- Protect the water source from contamination.

All farm water sources should be tested when the supply is first

connected and again about every five years. Test the water more often if you notice a significant change in the water quality, if a toxic spill occurs nearby, or if a change occurs in land use or activity. A thorough chemical and bacteriological analysis of water for household use can be done through your local health unit. Water samples for agricultural purposes can be taken to private labs for testing. These labs will supply sample bottles and correct procedures for sampling.

Water quality tests will point out any problems that need to be corrected. The water may have a poor taste, odor or color, or be high in total dissolved solids (TDS). Iron bacteria are a common well water problem. Treatments for these and other problems may include chlorination, special filters, water softeners or distillation.

Monitoring your water sources is an important step to ensuring a

lasting water supply. It can be compared to checking the oil in a vehicle or doing soil tests. You will have advance notice of changes to the water supply and a chance to make changes before the problem is serious.

Regular maintenance such as shock chlorination is necessary. Well design should allow for this required maintenance. Both dugouts and wells are susceptible to contamination from various sources. Keys to prevent contamination include proper location, proper design, plugging abandoned wells, fencing, runoff controls and grass cover around dugouts.

Developing an adequate and dependable water source takes a great deal of planning and maintenance but if approached properly, the water source will provide a dependable and adequate supply for many years to come.

Study Shows Water Well Contamination Occurs Close to Home

By Clint Hilliard,
Agriculture and Agri-Food Canada -
PFRA

Activities on the farm may pose risks to the safety of well water that is used for drinking. Nitrogen contamination in particular may occur and pose a threat to human health. Well owners should be alert for potential sources of groundwater pollution.

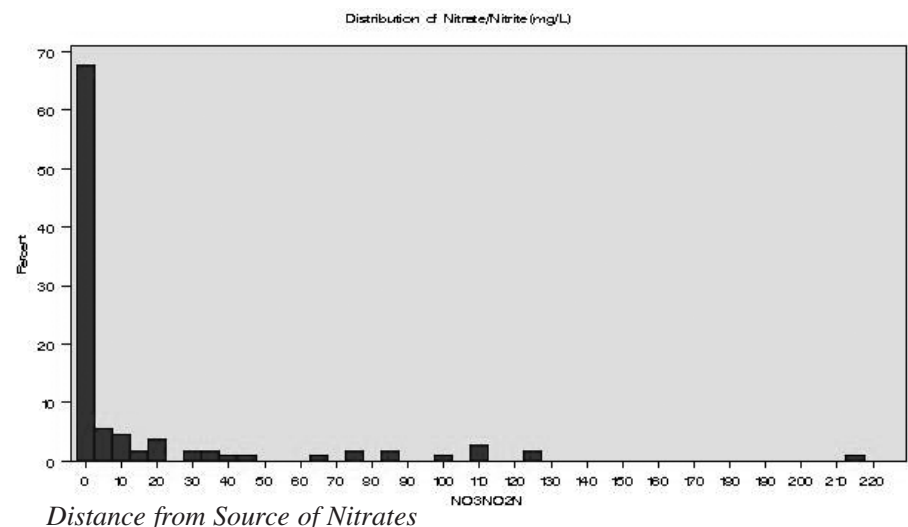
Unfortunately, many water wells in rural areas provide poor quality water. Although naturally occurring dissolved minerals are commonly the cause of poor quality, groundwater sources are frequently impaired by pollution. High nitrate levels in drinking water can be a serious health

risk for infants and individuals with weak immune systems. They can also be fatal to ruminant animals.

Recently, a research project in central Saskatchewan looked at

nitrate levels in all of the water wells in the rural municipality (RM) of Leroy in central Saskatchewan and

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the proximity of those wells to different types of activities or factors that might affect water quality. The factors included distance from the well to septic fields, fuel storage tanks, corrals, feedlots, manure storage areas, and lands to which pesticides, chemical fertilizers and manure had been applied.

Two major deep aquifers underlie the study area; the Hatfield Valley Aquifer and the Wynyard Formation Aquifer. The two aquifers are connected hydraulically and the water quality of both is quite poor due to high levels of dissolved solids. Wells completed in these formations provide water that is generally unsuitable for human drinking water but acceptable for livestock watering. Most of the wells that are used for domestic purposes are shallow wells, and many of these are completed in shallow deposits of sand and gravel. Half of the wells drilled in the RM were developed after 1990, whereas 79 percent of the dug or bored wells

were developed prior to 1990.

In the municipality a total of 143 wells were identified; 109 active and 34 abandoned. Of the known abandoned wells, only 4 were known to be sealed. More than 70 percent of these are small diameter (< 12 inches) wells. Observed nitrate levels ranged from 0.01 to 213.50 mg/L with an average of 15.60 mg/L. The national health guideline for nitrate is 10 mg/L as N. It should be noted that some labs will report the nitrate level as NO₃ in which case the national health guideline is 45 mg/L as NO₃. The graph shows that greater than 65% of the samples were under 2.5 mg/L nitrate but the variation is wide among the remaining third of the wells with a few extremely high values. Twenty-five percent of the wells actually exceed the health guideline for nitrate.

Wells exceeding the nitrate guideline of 10 mg/L as N were examined separately and two-thirds of them had at least one of the identified risk factors associated with them. In other words, two out of three of the nitrate contaminated

wells are associated with either a corral, are in close proximity to land receiving nitrogen fertilizer applications, or are within 100 meters of a septic field.

Nitrate contamination is clearly associated with shallow wells and the areas of highest nitrate levels tend to occur on sandy and gravelly soil types. Deep wells show much lower levels of nitrate. Sandy soils allow water from the surface to leach rapidly to shallow water tables. Groundwater in these areas may be more susceptible to contamination from fertilizer and manure applied to surface soils.

Shallow bored wells are much more susceptible to nitrate contamination and than deep wells. In order to protect shallow groundwater from contamination, various 'beneficial management practices' can be implemented. Location of septic fields, livestock containment areas, manure storage areas, and fertilizer and pesticide storage areas is critical. Care should be taken to prevent runoff water from these areas to collect at a wellhead. Livestock should not be permitted to get close to the well. Well pit construction can be avoided by using pitless adaptors to minimize the risk of pollution at the well head. Wells should be routinely inspected for damage that may permit the inflow of water from anywhere but the developed aquifer. Areas where the soils are sandy or gravelly and water tables are shallow need special attention. All wells that are abandoned or no longer in use should be properly decommissioned to prevent accidental contamination of groundwater. Finally, well owners need to regularly test their well water to ensure that is safe for its intended purposes.



Well in Corral

Water Well Pits Can Pose Life-Threatening Dangers

By Richard Pasquill,
Manitoba Water Services Board and
Ken Williamson,
Alberta Agriculture and Food

While it happened several years ago, the following is a very good indication of how dangerous well pits can be at times. In 1999, Susan Staudinger, 19, in Red Deer County near Sylvan Lake, Alberta, went out to get some vegetables for dinner. Like many people in the area, the Staudinger family used their well pit as a cool place to store their vegetables. When her father, Harvey, got home minutes later, he noticed the barn door and the well access was open. When he looked into the pit, he saw Susan unconscious in a curled position at the bottom. Moments later, his son came to see why his father had entered the barn and found both his father and Susan unconscious in the bottom. He immediately ran to the house to get help and have his mother phone 911. Bruce Hilman, a friend of Doug's, ran back to the barn with him to help. As Doug entered the pit to help his father and sister, Hilman warned him not to stay down too long in fear that he too would become unconscious. By the time his mother called 911 and ran out to the barn, Doug was also unconscious and laying on top of Harvey and Susan. With help from a neighbor, who entered the pit with a rope harness attached, they were able to extract Doug out of the pit by the time the ambulance arrived within 10 minutes of the 911 call.

The three were rushed to the Red Deer Regional hospital where doctors were able to revive Harvey. Unfortunately both Doug and Susan



Well Pit

passed away on July 14th, 1999 after being taken off life support. It is astonishing that the events took place in a very short time period. Recounting, Harvey estimates that only 12-15 minutes had past after he arrived home and before the ambulance arrived. The cause of death was ruled a result of anoxic asphyxia or lack of oxygen. Eight years later, another local area man, and close neighbor of the Staudingers, luckily survived a similar incident after having used his well pit for cold storage without incident for more than 47 years.

Subsequent monitoring of the Staudinger's well indicated that the well was safe to enter 89.9% of the time but 10.1% of the time the air quality would not support life. The culprit in this case is nitrogen gas being released from the well water during low pressure weather cycles. The nitrogen displaced the oxygen needed for life and anyone entering the pit could become overcome by

the lack of oxygen. Most waters contain dissolved nitrogen and carbon dioxide which can be released at various times depending on the concentrations. In some cases, wells like the Staudinger's well are known to breath large volumes of gas during certain conditions which can prove fatal to humans in a confined space such as a well pit.

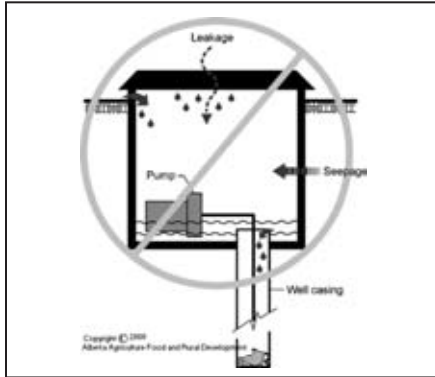
In 1993, legislation was passed in Alberta to prohibit the use of well pits. The legislation acknowledges the extremely high risk that well pits pose to individuals and to groundwater contamination. In rural areas well pits were first used to provide a convenient frost-free location for the landowner's water system. Over the years thousands of these below ground well pits have become flooded resulting in contamination flowing into the top of the well.

For anyone who has an existing well pit, it is highly recommended to extend the well casing, install a

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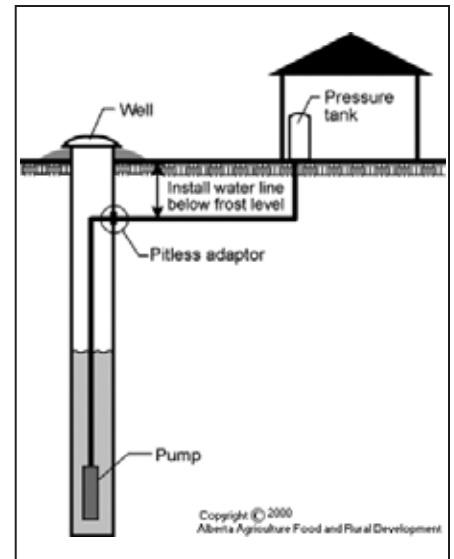
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proper frost free connection called a pitless adaptor, and fill in the pit



rather than taking the risk that nothing bad will happen to the well or your family. Pitless adaptors provide a safe below ground connection for the water system to the well.

This article has been prepared from an article written by Debra Beck, Corporate Communications Manager with the Red Deer County in Red Deer, Alberta. The article first appeared in the July 6, 2007 issue of the Red Deer County News. We thank the Staudinger Family and Debra Beck for allowing us to use this article in Prairie Water News.



Simple Well Depth Gauge for Everyone

By Richard Pasquill,
Manitoba Water Services Board

What is “Static Water Level” and “Pumping Water Level” in a well? How do you measure these water levels in a small diameter well when you cannot see the water? Why would you worry about what the static and pumping water levels are doing?

The static water level (SWL) in a well is the level the water will normally raise to when the pump is turned off and no water is being used. The pumping water level (PWL) is the level the water will drop to when the pump is operating and water is being used at a given capacity. Monitoring the water levels on a yearly basis can give a very accurate indication of the present condition of the water bearing formation and the condition of the well screen itself.

If the SWL in a well has a history of dropping lower each year, other than normal swings due to drought or seasonal conditions, it is an indication that the water usage is greater than the well recharge and the formation is drying up. In this case, an alternate

water source should be developed before the well quits producing sufficient water to meet the needs. If the SWL remains within normal boundaries but the PWL drops (at the same pumping capacity), this indicates the water is not coming into the well as easily as it was originally and the screen is plugging off with mineral deposits. Over time all screened wells will encounter plugging problems due to mineral incrustation of the screen but the speed with which it occurs is directly dependent on the water quality. It should be noted that there is a direct relationship between the SWL and the PWL. As the SWL drops due to drought or seasonal changes, there will be a corresponding drop in the PWL of the well.

If it is determined that the screen in the bottom of the well is starting to become plugged with minerals at the early stages, you can arrange to have the well serviced and brought back to near new condition long before water shortages are noticed. If a well screen is allowed to become too plugged with minerals before the well

is serviced, even an experienced well driller will not be able to fully rehabilitate the well to near new condition. It is always best to rehabilitate the well screen when the pumping water levels have dropped 10%-15% of original.

Monitoring the water levels on a yearly basis can give a very accurate indication of the present condition of the water bearing formation and the condition of the well screen itself.

While well drillers and water well technicians all have well depth gauges they can use to determine the present water levels, they are expensive and can be hard to use for the normal well owner. There is, however, a method that the normal well owner can utilize to keep an eye on the water levels in the well at any time. It simply involves the use of a small copper tube, a pressure or

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altitude gauge, a tire valve and a bicycle tire pump. The tubing is run down inside the well (usually attached to the drop pipe) to a depth that will always be under water. You must know the exact distance from the middle of the gauge to the tip of the copper tubing. The pressure/altitude gauge and a tire valve are attached to the top of the copper tubing. Whenever a water level is needed, you simply attach the bicycle pump to the tire valve and pump air into the pipe until the pressure/altitude gauge reaches the maximum

reading. This reading is the point at which further supply of air will not increase the reading to any higher value. With the reading on the pressure gauge, the water level can easily be calculated.

When air is added to the copper tubing, the pressure created will displace the water inside the tube by forcing it out the bottom. Since one pound of pressure will displace 2.31 feet of water from the tube, the exact depth of water that had to be displaced can be calculated. To convert the reading in PSI to feet of

water, multiply the pressure (from the pressure gauge) by 2.31. If an altitude gauge is used, the reading will already be in feet and no conversion will be needed.

Example: Assume the tubing is 100 feet long from the center of the gauge to the bottom end of the pipe and that the highest reading of the gauge is 15 PSI.

(See Diagram)

Let X = Depth to Water Level
(in feet) Unknown

Y = Known Length of Air Line
(in feet)

Z = Air Pressure inside Copper
Tubing. (From Gauge)
(Multiply PSI by 2.31 to
convert to feet)

$$X = Y - (Z \times 2.31)$$

$$X = 100 - (15 \times 2.31)$$

$$X = 100 - 34.65 \text{ ft.}$$

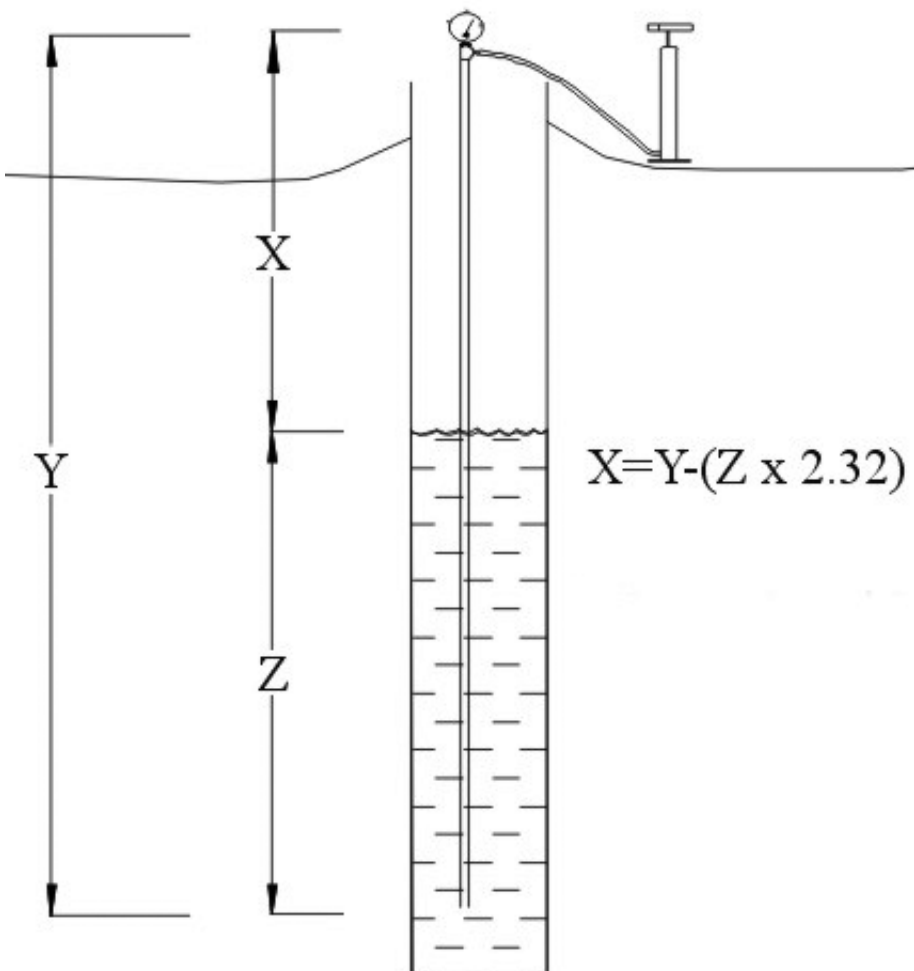
$$X = 65.4 \text{ ft.}$$

In this case, the water level would be 65.4 feet below the center of the gauge.

For ease of reading and increased accuracy, it is important to select a large-faced pressure gauge with relatively low maximum reading. Unless the depth of water over the end of the pipe is greater than 70 feet, a 3" diameter 0-30 PSI gauge is ideal. A gauge of this type is much easier to read than a 1 1/2" diameter 0-100 PSI gauge normally found on most pumps.

Knowing what your well and water levels are doing over time will save you the problem of suddenly having to haul water for a yard full of livestock or the house in the middle of winter and will give you time to arrange to have the well properly serviced.

For more information, please contact your local Provincial Water Technologist or PFRA.



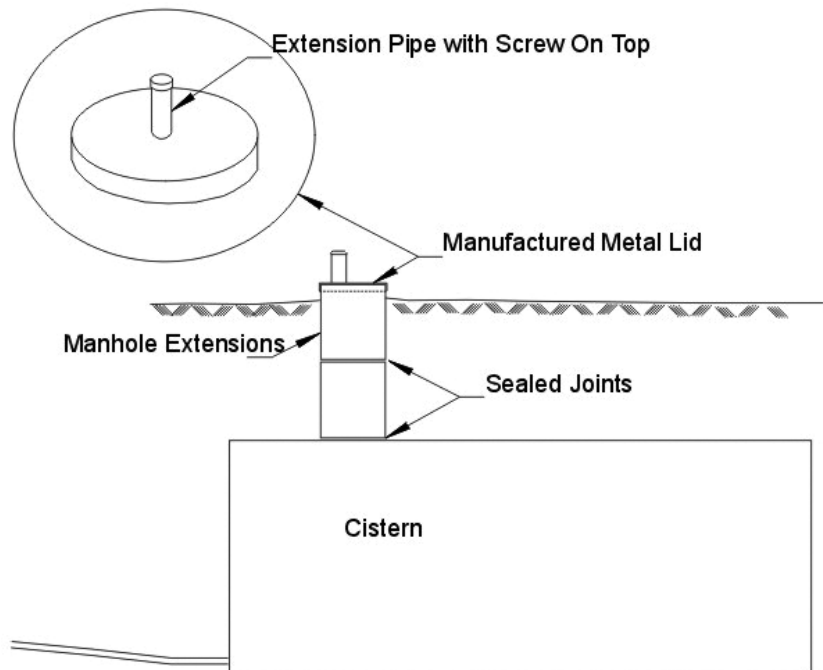
Water Level Calculation

Insure the Joints of a Cistern are Properly Sealed

By Richard Pasquill,
Manitoba Water Services Board

In parts of the country, it is nearly impossible to find a good groundwater source of water for the house. In many of these cases, the home owner will opt to install a cistern and have clean water hauled in for domestic use. During the last few years, we have been encountering more and more contamination problems with buried outside cisterns. This is likely the result of a greater public awareness of possible problems with contamination of the water source and a greater emphasis on having the water tested for bacterial contamination. In some cases it is a problem with poor or lack of maintenance of the cistern itself or it could be a result of poor installation techniques or cistern design.

Many of these buried cisterns are constructed of either concrete or fiberglass. While the main body of the tank is made to hold water and is therefore water tight and not open to contamination from the surrounding ground, the extension or manhole providing access is not. As example, when a concrete tank is installed with a minimum of two feet of earthen cover, the joints are often not sealed properly or not sealed at all. In many cases, this manhole extension is back filled with granular material to prevent settling. Unfortunately, any rains or spillage of water on the area surrounding the access hole will simply flow through the granular material, through the open joints and into the cistern carrying with it numerous contaminants from the soil. In other cases, the person hauling



Areas to be Sealed

water will fill the cistern too full filling up the manhole extension as well as the cistern. This excess water will flow out through the joints into the surrounding soil and then flow back again as soon as some water is taken from the cistern. This often results in murky or dirty water for a short time after the cistern has been filled. Many residents will mistakenly assume the water is simply riled up during the filling process and there is no cause for concern. Any flow of water from the outside to the inside of the cistern is a concern as it will always bring in a number of contaminants as it flows back into the cistern.

A simple way of checking to see if the joint in the manhole are properly sealed would be to use garden hose and pour water on the ground surrounding the top of the manhole.

If seepage coming into the cistern around the manhole is observed, steps should be taken to properly seal this area of concern. For proper sealing, the area around the manhole would have to be excavated, the extensions removed, cleaned, caulked with a high grad of caulking and the extensions reinstalled.

Another point of concern is the height of the manholes above ground level. In most cases, the cistern and extensions are installed and left level with the surrounding ground. While this may look better to the home owner, this practice leaves the top of the cistern open to contamination through the lid itself. It is best if the unit is installed in such a manner that the top of the lid is at least 6 inches higher than the surrounding ground level. If possible, it would also be

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recommended that it have a new lid constructed of metal to replace the existing lid on a concrete or fiberglass tank. The metal lid is much stronger and can be constructed with a lip on the edge that extends down the outside of the manhole at least 2 inches and fit fairly tight to the extensions to prevent bugs and other critters from finding a way into the cistern. With a metal lid, an extension pipe with a removable cap can be welded in place to facilitate filling or checking of the cistern

without removing the lid itself. Each time the lid is removed from the top, the system is opened to foreign objects falling into the water causing contamination.

If cisterns are set up and operated properly, the amount of additional cleaning and maintenance required to keep the water safe and bacterially free is kept to a minimum. It is always wise to remember that any time the cistern needs to be cleaned or maintenance performed on the inside, special precautions must be

taken and this task should be left up to someone who has all the necessary equipment and expertise to carry out the necessary works. Cisterns and wells can be very dangerous places in which to work as there is always a very strong possibility that dangerous gases exist in the bottom that can cause a simple task to turn deadly.

For further information, you may wish to contact your local water technologist or PFRA office.

FAST FACTS

- Any flow of water from the outside to the inside of a cistern is a concern as it will always bring in a number of contaminants.
- A simple way of checking to see if the joints in a manhole are properly sealed would be to use a garden hose and pour water on the ground surrounding the top of the manhole, and observe whether any seepage comes into the cistern.
- Any time a cistern needs to be cleaned or maintenance performed on the inside, special precautions must be taken.

My Hot Water Stinks

*By Bob Buchanan,
Alberta Agriculture and Food*

Although taste and odor problems can affect both hot and cold water, usually hot water causes more complaints - especially complaints about the rotten egg stench. A number of conditions can contribute to the occurrence of these odors. This article reviews a few of the basics relating to the formation of rotten egg odors, especially those associated with hot water.

Sulfates in water will chemically reduce to sulfides by natural chemical processes; however, sulfate-reducing bacteria can significantly accelerate the sulfate-reduction reaction. The sulfate-reducing bacteria utilize organic matter in the water or the

corrosion of metals as their energy source. The result is the production of hydrogen sulfide gas with its distinctive rotten egg odor.

Complaints of rotten egg odors are more common for hot water than cold. The solubility of the hydrogen sulfide decreases as the temperature increases, causing the gas to be expelled when hot water is released from the tap. Sulfate-reducing bacteria activities in the groundwater aquifer, distribution system, or hot water heater tank may all be responsible for the hydrogen sulfide concentration.

Corrosion protection

The method used to provide corrosion protection of most water

heater tanks can produce an ideal environment for the production of hydrogen sulfide gas. Modern water heaters are glass-lined to prevent corrosion, but assuring 100 percent glass coverage protection is impossible, especially since cracks or voids in the glass coating may occur, a long magnesium rod, an "anode," is used to provide corrosion protection for the exposed steel parts of the tank. Instead of the steel parts being eaten away by corrosion the magnesium anode is eaten away. There will be no corrosion of the exposed steel so long as the magnesium anode remains in the tank and has not been totally sacrificed to protect the tank wall. Unfortunately

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this chemical corrosion can also provide an ideal environment for the sulfate-reducing bacteria to flourish and accelerate the rate of sulfate reduction which produces the hydrogen sulfide gas.

Ion-exchange water softeners can increase rotten egg odors

A frequent contributor to the odor problem is the standard ion-exchange water softener used for household water treatment. The softened water is more corrosive than the water was before the calcium and magnesium hardness ions were exchanged for sodium ions in the salt. Therefore, the use of a softener increases the rate at which the magnesium anode is sacrificed. This again accelerates the growth of sulfate-reducing bacteria and sulfate reduction and increases odor complaints.

Methods to solve the rotten egg odor problem

To remedy rotten egg odors in hot water, any one of the following methods may be used:

- (1) maintaining chlorine residuals
- (2) flushing low-flow distribution lines
- (3) killing the bacteria with increased heat
- (4) replacing magnesium anode rods with zinc
- (5) removing the cathodic-protection anode entirely.

Maintaining chlorine residuals

Maintaining a chlorine residual of 1 mg/L throughout the distribution system oxidizes any hydrogen sulfide present and inhibits bacterial activity and corrosion associated with sulfate-reducing bacteria. In a nonchlorinated

system, periodic disinfection and flushing of the water heater tank with a chlorine bleach solution may be sufficient. If the problem is severe or persistent, a chlorine feeder system may be required.

Flushing distribution lines and hot water tank

Flushing of low flow water lines and looping of distribution lines and looping of distribution lines to eliminate dead ends can reduce the concentration of the sulfate-reducing bacteria and help to alleviate the problems they cause. Flushing the hot water tank can also remove organic matter that can settle out in the bottom of the hot water tank.

Killing bacteria with heat

The thermal death point of sulfate-reducing bacteria is approximately is 60 Degrees Centigrade (C) or 140 Degrees Fahrenheit (F). Water heaters are usually factory set at approximately at 60 degrees C, which is the "medium" setting on the temperature control dial. Increasing the temperature to the "high" setting of 71 Degrees C for several hours and flushing the tank should kill the sulfate-reducing bacteria and greatly reduce the odor problem until the population of the bacteria becomes high again.

CAUTION: The hot water tank must have an operable pressure relief valve; otherwise, this method of treatment may be dangerous. The temperature setting must be reduced following treatment to eliminate the risk of persons being scalded from dangerously hot water and to avoid higher energy cost.

Replacing magnesium anode rods

A zinc anode can be used to replace the magnesium anode. It will often

reduce the rotten egg odor problems but may not totally eliminate them.

Removing corrosion-protection anode

Removal of the corrosion protection anode is not a preferred method, but it may alleviate the odor problem. The method eliminates all the corrosion protection for the tank, which may shorten tank life, especially where water softeners are in use. It will also void the manufacturer warranty on the tank so you should talk to the supplier and/or manufacturer of the hot water tank before you decide to do this.

Procedure to remove or replace anode

The magnesium anode can be removed from the tank as follows:

- Shut off the electric power or gas supply to the hot water tank.
- Close the cold inlet supply valve.
- Open a hot water tap close to the tank and also a hot water tap at the highest point in the house.
- Drain a few gallons from the tank either through a hot water tap or by opening the drain valve at the bottom of the tank.
- Use a 1 1/16 inch socket to loosen the nut that secures the magnesium anode in the top of the tank.
- Remove the anode and inspect or replace it as required.
- Drain and flush the hot water tank of any sediment.

This article has been prepared from an article written by David Hack, Water Specialist with the Missouri Department of Natural Resources in Jefferson City, Missouri. The article was revised and used with the permission of the American Water Works Association.

61st CWRA annual conference

16-19 June 2008 gimli, manitoba | managing the health of canada's lakes and rivers



CWRA ACRH
 Canadian Water Resources Association
 Association Canadienne des Ressources Hydriques

objectives of the conference

The theme of *Managing the Health of Canada's Lakes and Rivers* through an improved understanding of watershed influences, has been chosen for the 61st Annual Conference of the Canadian Water Resources Association (CWRA). The Manitoba Branch of CWRA invites you to Gimli, Manitoba from June 16th to 19th, 2008 to discuss how we can best manage Canada's watersheds for the health of our lakes and rivers for the benefit of current and future generations. Gimli is located on the western shore of Lake Winnipeg - the 6th largest freshwater lake in Canada, and the 11th largest lake in the world.

venue and accommodation

The 2008 CWRA National Conference will be held at the Lakeview Resort in Gimli, Manitoba. The resort, located along the shores of Lake Winnipeg, offers a number of attractive features. Further information about the conference venue can be found at: www.lakeviewhotels.com/gimlireport/index.php

A block of rooms has been set aside at the Lakeview Resort for conference participants at a special CWRA conference rate. Delegates are encouraged to make their arrangements with the resort as early as possible by calling 1-877-355-3500. Please quote **CANADIAN WATER RESOURCES ASSOCIATION** when making your hotel reservation.

2008 CWRA Annual Conference
www.conference.cwra.org



objectifs du congrès :

Le thème *Gérer la santé des lacs et des rivières du Canada* grâce à une meilleure compréhension de l'influence des bassins hydrographiques a été choisi pour le 61e congrès de l'Association canadienne des ressources hydriques (ACRH). La section manitobaine de l'ACRH vous invite à Gimli (Manitoba) en juin 16 -19, 2008, pour discuter des meilleures façons de gérer les bassins hydrographiques du Canada pour la santé de nos lacs et rivières au profit des générations actuelles et futures. Gimli est située sur la côte ouest du lac Winnipeg – le sixième plus grand lac d'eau douce au Canada, et le onzième plus grand lac au monde.



Lieu du congrès et hébergement

Le congrès 2008 de l'ACRH aura lieu au Lakeview Resort de Gimli, au Manitoba. Le centre de villégiature, situé au bord du lac Winnipeg, offre plusieurs attraits. Vous pouvez obtenir de plus amples renseignements sur le lieu du congrès à www.lakeviewhotels.com/gimlireport/index.php. Des chambres ont été retenues au Lakeview Resort à un tarif spécial pour les participants au congrès de l'ACRH.

On encourage les participants à faire leurs préparatifs auprès du centre de villégiature le plus rapidement possible en téléphonant au 1-877-355-3500. Veuillez mentionner **L'ASSOCIATION CANADIENNE DES RESSOURCES HYDRIQUES** lorsque vous réservez vos chambres.

2008 congrès de l'ACRH
www.conference.cwra.org



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