

## Low Level Chlorine Well Disinfection (Shock Disinfection)

(For Private Water and Health Regulated Public Water Supplies)

### Acknowledgement:

This fact sheet is one of a series developed by an Interagency Committee with representatives from Saskatchewan Health, Regional Health Authorities, Saskatchewan Water Security Agency, Saskatchewan Agriculture, Agriculture and Agri-Food Canada and Saskatchewan Environment.

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Disinfection is routinely used to control bacteria in wells and is applied as part of a start-up procedure for newly constructed wells and should be used as semi-annual maintenance for existing wells. Disinfection should also be performed in the event of contamination (e.g.: flooding or unacceptable levels of bacterial growth, see *Coliform Bacteria Fact Sheet*). Well disinfection can be performed by two methods low and high level disinfection. High level disinfection is the preferred option (see *High Level Chlorine Well Disinfection Fact Sheet*). However, if proper equipment (e.g. 1360 litres [300 gallons] tank) is not available then low level disinfection, as described in this fact sheet, may be adequate.

### Materials Required

- Disinfection can be conducted using unscented household bleach. Check the product label to ensure that the chlorine is in the form of sodium hypochlorite or calcium hypochlorite. Some "all purpose bleaches" (such as Javex 2) contain a chlorine alternative and no chlorine and should not be used for disinfecting wells.
- Table 1 outlines the quantity of bleach required to properly disinfect a well.

### Procedure

1. Follow chlorine manufacturer's instructions for use. Chlorine concentrations at this level are dangerous. Avoid contact with skin, inhaling the fumes and wear protective clothing/eye wear. If your well is located in a pit, you must make sure there is proper ventilation during the chlorination procedure. It is recommended that you contract the services of a licensed well driller who has the proper equipment and experience to do the job safely.
2. Ventilate confined spaces (e.g. well pit, crawl space and all other confined spaces) where potentially dangerous levels of vapours may accumulate.
3. Do **not** run chlorinated water through certain types of water treatment equipment (e.g. softeners, carbon filters, reverse osmosis systems). For specific information, contact your equipment dealer or the Saskatchewan Water Security Agency.
4. If a well is slow yielding or tends to pump any sediment, slowly siphon the solution down the well and pump it out very slowly. Over pumping the well may worsen the sediment problem.
5. The disinfection treatment will require the well to be taken out of service. Therefore, store sufficient water to meet all necessary requirements for a minimum 12-hour period.
6. Slowly add the amount of unscented bleach indicated in Table 1 directly into the well. Connect a garden hose to a nearby tap and wash down the inside wall of the well. This will ensure thorough mixing of the chlorine and the water throughout the well.
7. Start the pump and bleed air from the pressure tank. Open each tap and allow the water to run through all taps until a smell of chlorine is detected, then turn off the taps. If a strong smell is not detected, add more bleach to the well and repeat step 7.
8. Allow the water to sit in the system for at least 12 hours. Chlorine can be very corrosive if left in the water distribution system for too long a period of time.
9. After at least 12 hours, flush the system by pumping the well water through an outside hose (do not exceed the well pumping rate-over pumping the well may worsen any sediment problem) away from grass, shrubs, trees and other sensitive plants until the strong smell of chlorine disappears. Make certain that the water does not enter any

watercourse. Finally, open the indoor taps until the system is completely flushed. Return the system to normal operation. Please note that chlorine can react with organics or other substances to produce by-products in certain cases, therefore it is important to flush the well prior to returning it to service.

10. If low level disinfection is being used to eliminate a bacterial problem, verify that the procedure has removed the bacteria by following the steps under **Disinfection Verification**.

**Table 1. Disinfection of Well Water with Unscented Household Bleach (Approximately 5.25% Hypochlorite)**

Depth of water in well (m)	Volume of Bleach Added (5.25 % chlorine)	
	Casing diameter: 15 cm (drilled well) *	Casing diameter: 90 cm (large-diameter bored well) **
1.0	100 mL	3.2 L
3.0	300 mL	9.8 L
5.0	500 mL	16.5 L
10.0	1000 mL	32.0 L
30.0	3000 mL	96.0 L

\* A chlorine concentration of about 250 mg/L is used for low level disinfection. Table 1 – is derived from Health Canada's publication, "A Guide to Well Water Treatment and Maintenance", June 5, 2000

\*\* For large diameter bored wells the volume of chlorine can be reduced by approximately half if industrial strength chlorine (12% sodium hypochlorite) is used. Industrial strength chlorine is available from any chemical dealer, water treatment supplier, or dairy supply retailer.

### Disinfection Verification

- Until water testing indicates that the water is safe to use, find another source of water, or boil the water for one minute, at a rolling boil, before consuming. This precaution is particularly important for persons who are immunocompromised and also if the water is being used for infant feeding (preparing formula, etc.).
- For **private water supplies**, it is recommended that a sample be taken at least five days after treatment and another twelve days after treatment with at least one week of constant use. Two consecutive 'safe' test results are required to ensure that the treatment was effective.
- For **Health regulated public water supplies**:
  - wells not receiving continuous treatment require a sample taken five days after treatment and another twelve days after treatment with at least one week of constant use,
  - Wells receiving continuous disinfection treatment require at least two consecutive sets of samples. The samples should be taken at least one day after the treatment and one day apart. Health Region officials will be advising the owner/operator of the supply on number of samples, sampling locations and as to when the water supply can be used again for human consumption.
- In general, all private systems should be analysed at least once a year or whenever there is reason to believe that the water supply may have become contaminated (e.g. flooding).
- Health regulated public water supplies must sample as required by the health region.

If the low level disinfection procedure does not eliminate the bacterial problem, obtain a copy of the *High Level Disinfection Fact Sheet* and follow the procedural steps.

## Need More Information?

<p><b>Government of Saskatchewan</b> Water Information website <a href="http://www.SaskH2O.ca">www.SaskH2O.ca</a></p>	<p><b>Water Inquiry Line</b> Questions about water? Call 1-866-SASK H2O (1-866-727-5420) to be referred to proper agency.</p>
<p><b>Saskatchewan Ministry of Health</b> <a href="http://www.health.gov.sk.ca/environmental-health">http://www.health.gov.sk.ca/environmental-health</a> 1-800-667-7766 1-306-787-0146 3475 Albert St Regina, SK S4S 6X6</p> <p><b>Regional Health Offices</b> Saskatoon: Saskatoon (306) 655-4605 Sunrise: Yorkton (306) 786-0600 Kelsey Trail: Melfort (306) 752-6310 Five Hills: Moose Jaw (306) 691-1500 Sun Country: Weyburn (306) 842-8618 Heartland: Rosetown (306) 882-6413 Prairie North: North Battleford (306) 446-6400 Prince Albert Parkland: Prince Albert (306) 765-6600 Cypress: Swift Current (306) 778-5280 Regina Qu'Appelle: Regina (306) 766-7755 Mamawetan Churchill River: La Ronge (306) 425-8512 Keewatin Yatthe: Buffalo Narrows (306) 235-5811</p>	<p><b>Saskatchewan Water Security Agency</b> Head Office, Moose Jaw (306) 694-3900 Website: <a href="http://www.wsask.ca">www.wsask.ca</a> <i>Regional Offices:</i> <a href="https://www.wsask.ca/About-WSA/Regional-Offices/">https://www.wsask.ca/About-WSA/Regional-Offices/</a></p> <p><b>Sask Water Corporation</b> Head Office, Moose Jaw Customer Service 1-888-230-1111 Website: <a href="http://www.saskwater.com">http://www.saskwater.com</a></p> <p><b>Saskatchewan Ministry of Agriculture</b> General Inquiry 1-866-457-2377 Agricultural Operations Regina (306) 787-4680 Irrigation Development Outlook (306) 867-5500 Website: <a href="http://www.agriculture.gov.sk.ca">www.agriculture.gov.sk.ca</a></p>
<p><b>Saskatchewan Ministry of Health</b> <b>Saskatchewan Disease Control Laboratory, Regina</b> General Inquiry 1-866-450-0000 Phone: (306) 798-2125 // Fax (306) 798-0071 Website: <a href="http://www.health.gov.sk.ca/lab">http://www.health.gov.sk.ca/lab</a></p>	<p><b>Saskatchewan Ministry of Environment</b> Toll-Free 1-800-567-4224 Spill Emergency Toll-Free 1-800-667-7525 Website: <a href="http://www.environment.gov.sk.ca">http://www.environment.gov.sk.ca</a></p>
<p><b>Health Canada</b> First Nation and Inuit Health Branch, Regina (306) 780-6561 Website: <a href="http://www.hc-sc.gc.ca">http://www.hc-sc.gc.ca</a></p>	