



Rural Wellhead Protection Fact Sheet

WELL MAINTENANCE

JUNE 1998

Printed on recycled paper

INTRODUCTION

Existing wells must be maintained and operated correctly to prevent well deterioration and aid in preventing contamination of your water supply. Similar to your car or tractor, your well needs regular maintenance. This maintenance includes simple measures; such as, keeping the wellhead area clean and accessible, and moving any pollutants as far away from the well as possible. Other more extensive measures may involve hiring a qualified pump installer or well technician to inspect the operation of the pump and the integrity of the well casing. Many problems can be prevented by following proper well design and installation practices during the construction of the well. Your well should also be sampled regularly to verify that no contaminants are present in the water.

WELL MANAGEMENT

General procedures for protecting your water supply wells should include use of backflow preventers and plastic nurse tanks, and maintaining a slope or curb that directs surface runoff away from the wellhead. Minimum maintenance on a well should include an annual check of the well and any treatment system. It is your responsibility to maintain your well in good condition to protect the quality of groundwater.

Backflow Preventers

If you mix pesticides or fertilizers in tanks next to your wellhead or do fertigation and/or chemigation at irrigation wellheads, a backflow prevention device is required. Fertigation is the process of adding fertilizers to irrigation water at the wellhead. Chemigation is the addition of chemicals such as pesticides to irrigation water at the wellhead. Chemigation at a wellhead is not recommended, and it may require the issuance of a Chapter III Permit from the Wyoming Department of Environmental Quality, Water Quality Division (WDEQ/WQD).

A backflow prevention device will prevent chemicals from flowing back into the well or back-siphoning, which can directly contaminate the groundwater when the well pump is turned off. Simple backflow preventers are also recommended for common

household water uses such as laundry tubs, sinks, dishwashers, washing machines, and outside hydrants used to fill tanks. Maintaining an air gap between the hoses/ faucets and the well will prevent the backflow of contaminated water. Any household appliances that require a cross-connection between potable and non-potable water need to have backflow preventers.

Nurse Tanks

It is highly recommended that any fertilizers, pesticides, or other chemicals be mixed and loaded in an area that is as far away from the wellhead as feasible; a minimum distance of 100 ft. is recommended. The use of inexpensive nurse tanks is recommended to allow mixing in the field. They can be filled with water at the wellhead and transported to the field far from the wellhead for mixing. Sprayer tanks can then be filled from the nurse tanks in the field. Nurse tanks and chemical storage containers should be thoroughly rinsed before being stored or thrown away. The rinsing water should be disposed of in an acceptable manner, such as applying it to fields at normal application rates.

Surface Water Protection

A finished cement cap is typically placed at the wellhead. The cement cap is sloped away from the well to prevent water from surface runoff accumulating at the top of the casing. If an existing well does not have this cement cap, it is recommended that a cap be installed to a depth extending just below the frost line. The ground surface needs to be built up and mounded around the wellhead. If water accumulates and ponds in a low area near the well, berms or curbs need to be placed in appropriate locations surrounding the well to divert runoff from the wellhead. Soil berms and mounds need to be checked periodically and repaired as needed.

WELL MAINTENANCE

Regular maintenance checks should be completed on your well. You may need to disinfect your well, pressure tanks, and distribution system. Artesian or flowing wells normally require more maintenance because the valves and casings must prevent leakage and withstand the pressure exerted by the water.

Well Disinfection

Before drilling, a contractor should disinfect all bits, tools, pumps and any other material that may enter the drill hole during the drilling process. All filter pack material and drilling water should be disinfected. A common disinfection chemical treatment is chlorination, which normally requires some type of agitation to effectively kill bacteria. The contractor should also disinfect the well, pump, and piping after completion of the well. The process of disinfecting a well involves the addition of a disinfection agent, such as a form of chlorine like calcium hypochlorite or sodium hypochlorite tablets, combined with physical agitation to disinfect the entire well borehole. After agitation, the disinfecting solution should be left in the well for at least four hours. The piping, storage tanks, pump, pressure tanks, and distribution system should also be disinfected by pumping the disinfecting solution into the system and leaving it in the system for at least two hours. Before placing the well system back into service the chlorine residue needs to be flushed from the system.

Well Yield

Every well should have a pump test done after it is installed. The owner of the well should keep copies of these tests and any other well records. Information about your well may be available from the Wyoming State Engineer's Office ((307) 777-7354). Periodically, the well performance should be tested by measuring the highest sustainable well pumping rate in gallons per minute for a period of continuous pumping. If 10 - 15% reductions are measured in yield, the cause(s) of decreased yield need to be identified and corrected. If a 25% or greater reduction in yield is measured, the money required to fix the problems may be better applied to the installation of a new well.

The type of aquifer that a well is installed in will affect how frequently maintenance is required to increase well yields. Shallow wells located in alluvial sands and gravels will require more frequent maintenance. Municipal water supply wells in alluvial aquifers require maintenance every 2 - 5 years. Reductions in well yields may be caused by the following problems: 1) plugging of the screen or the formation around the well caused by incrustation or biofouling; 2) plugging of formation by fine particles; 3) pumping sand; 4) collapse of well casing or screen; and 5) a damaged pump.

Well Rehabilitation

Correcting the problems described above will typically require a qualified water well contractor. Many of the problems described above may be prevented by

following proper well design and installation practices. The procedure for cleaning up plugging caused by mineral deposits requires treating the well with strong acids that should only be attempted by qualified well technicians. Biofouling may be prevented by disinfecting all downhole equipment and materials during well installation. Physical plugging of wells and the pumping of sand can be prevented by proper well design and thorough well development during installation. Adding polyphosphates or surfactants added to a well, combined with thorough physical agitation will help to remove fine material from the formation. Corrosion of a well casing and screen can be prevented by using the correct well casing materials. Installation of cathodic protection may be required on existing wells to reduce corrosion rates. Well pumps may be damaged in wells without well screens and/or filter packs or wells with improperly sized well screens and/or filter packs. Replacing the pump in an improperly constructed well is not a good solution, since the new pump will eventually fail. A better alternative may be to replace the screen or place an inner screen in the well. If it is difficult and expensive to improve the performance of an existing well, it may be wiser and more economical to drill a new well.

Well Sampling

Well water should be sampled on at least an annual basis. Sample your well any time you think a health problem may be caused by a disease producing microorganism in your water supply, or if you notice significant changes in the taste, smell, or color of the water. At a minimum, the laboratory should analyze for the following parameters: pH, nitrates, ammonia, total coliform bacteria, and total dissolved solids. If you suspect any other contaminants, such as hydrocarbons from petroleum leaks or spills, or spills of pesticide liquids, include these specific parameters in the test. If any parameters in your well exceed acceptable limits, always retest immediately to verify the first test.

The state of Wyoming has two state laboratories (*see References/Contacts*) in Cheyenne and Laramie that will analyze your samples. Your UW Cooperative Extension Service (UWCES) county office or local health department should have a current listing of local private laboratories that will also conduct water analyses.

If your water system contains over (1) coliform bacteria per 100 milliliters, it may not be safe to drink due to bacteriologic contamination. Contact a qualified well contractor to disinfect your well; tanks, and distribution system. If the sample was taken at your water tap, the bacteria may be present within your pressure tank or

distribution system. Exposure of the well or piping system is sometimes necessary in order to perform various procedures such as repairs or maintenance. Please remember that whenever the well or piping system is exposed, it may be invaded by foreign matter that contains bacteria. The well system should be disinfected prior to placing it back into service.

All back-siphoning occurrences or major spills or leaks must be reported to the WDEQ/WQD. To report and receive assistance, please call the 24-hr Emergency Contact of the DEQ/Water Quality Department, at (307) 777-7781. If you are calling between 8 a.m. - 5 p.m., please ask to talk with someone concerning the spill response program.

References/Contacts

References

Drinking Water Quality Standards

U.S. Environmental Protection Agency's Safe Drinking Water Hotline. Call toll free 1-800-426-4791 from 8:30 A.M. to 5:00 P.M. Eastern Time.

Contacts

State/Federal Agencies

Wyoming Dept. of Environmental Quality, Water Quality Division, 122 W. 25th St. 4W, Cheyenne, WY 82002, (307)777-7781.

Wyoming State Engineers Office, 122 W. 25th St. Herschler Bldg., 4E, Cheyenne, WY 82002, (307)777-7354.

Geological Survey of Wyoming, P.O. Box 3008, University Station, Laramie, WY 82071-3008, (307)766-2286.

U.S. Geological Survey, Water Resources Division, 2617 E. Lincolnway, Cheyenne, WY 82007, (307)772-2153.

U.S. Environmental Protection Agency, Region VIII, 999 18th St., Suite 500, Denver, CO 80202-2466, 1-800-227-8917.

University of Wyoming Water Resources Center, P.O. Box 3067, University Station, Laramie, WY 82071-3067, (307)766-2143.

State Laboratories/ Information:

Wyoming Department of Agriculture Analytical Services Laboratory, 1174 Snowy Range Road, Laramie, WY 82070. (307) 742-2984.

Wyoming Department of Health/Preventative Medicine Division - Public Health Laboratory, Cheyenne, WY. (307)777-7431. If you live in Laramie Co., contact a sanitarian in the Cheyenne Laramie Co. Health Department to perform the sampling of your water well. (307) 633-4090.

County Health Departments or County Extension Agents.

RURAL WELLHEAD PROTECTION WORKSHEET

WELL MAINTENANCE

Assessing the Management of Water Supply Wells

To assess the management of each water supply well on your ranch/farm, fill in the information in the blanks provided. You may want to make copies of these pages to evaluate each drinking water, livestock, and irrigation well that you listed on the **Well Construction Worksheet**. After completing the worksheet, review the **Well Maintenance Fact Sheet** to decide whether your management practices meet minimum requirements. Whether you checked the **YES** or **NO** column, if there is potential for you to improve the management of your water supply well, check the 'Can Improve' column.

	<u>YES</u>	<u>NO</u>	<u>CAN IMPROVE</u>
1. Is an annual check performed on your well?	_____	_____	_____
a. Briefly describe the procedures of the check.			_____

Backflow Preventers

2. When filling spraying or nurse tanks do you maintain air gaps between water hoses and the water level in the tanks?	_____	_____	_____
3. Do you maintain air gaps in hoses and faucets of common household water uses, such as:			
laundry tubs	_____	_____	_____
sinks	_____	_____	_____
dishwashers	_____	_____	_____
washing machines	_____	_____	_____
outside hydrants when filling swimming pools or tanks, etc.?	_____	_____	_____

Nurse Tanks

4. Do you mix or load pesticides and fertilizers in sprayer tanks in an area at least 200 ft. away from the wellhead?	_____	_____	_____
5. Are nurse tanks and chemical containers thoroughly rinsed before storage or disposal?	_____	_____	_____
a. Is the rinse water properly disposed, such as applied to fields at proper rates?	_____	_____	_____

