

**BUCHANAN COUNTY HEALTH AND SANITATION  
CODE OF ORDINANCES  
2008**

**TABLE OF CONTENTS**

**TITLE V – HEALTH AND SANITATION**

Chapter 41 – Abandoned Wells

# TITLE V – HEALTH AND SANITATION

## CHAPTER 41

### ABANDONED WELLS

41.01	Purpose	41.06	Abandoned Well Plugging Procedures
41.02	Definitions	41.07	Designator Agent
41.03	Abandoned Well Plugging Schedule	41.08	Designation of Standby Wells
41.04	Abandoned Well Owner Responsibilities		
41.05	Abandoned Well Plugging Materials		

#### 41.01 PURPOSE.

1. The purpose of this regulation is to implement Iowa Code Section 455B.190 by providing a schedule and required procedures for the proper plugging of abandoned wells to protect the groundwater by permanently sealing off contamination to individual aquifers.
2. This regulation governs the proper plugging of all abandoned wells in Buchanan County, Iowa. For additional guidance and background information, refer to “Guidelines for Plugging Abandoned Water Wells”, Technical Information Series 15, Geological Survey Bureau, Iowa Department of Natural Resources, 1987.

#### 41.02 DEFINITIONS.

1. Abandoned well: A water well which is no longer in use or which is in such a state of disrepair that continued use for the purpose of accessing water is unsafe or impractical.
2. Agricultural lime: All calcium and magnesium products sold for agricultural purposes in oxide, hydrate, or carbonate form.
3. Approved: Accepted or acceptable under an applicable specification stated or cited in these rules.
4. Aquifer: A water-bearing geologic formation capable of yielding a usable quantity of water to a well or spring.
5. Bentonite: A naturally occurring highly plastic, colloidal clay composed largely of the mineral montmorillonite which expands upon wetting.
6. Bentonite grout (or slurry): A mixture of 10 percent processed bentonite (by weight) and water which is free of contaminants, turbidity and settleable solids.
7. Bentonite pellets: A form of processed bentonite which can be used directly for sealing applications in well plugging operations.
8. Bentonite products: The forms of bentonite which can be used for sealing materials in wells, including graded bentonite, bentonite pellets and bentonite grout.
9. Casing: A tubular retaining structure installed in an excavated hole to maintain the well opening.
10. Class 1 well: A well one hundred feet or less in depth and eighteen inches or more in diameter.

11. Class 2 well: A well more than one hundred feet in depth or less than eighteen inches in diameter.
12. Class 3 well: A sand point well or a well fifty feet or less in depth constructed by joining a screened drive point with lengths of pipe and driving the assembly into a shallow sand and gravel aquifer.
13. Concrete: A mixture of one sack (94 pounds) of portland cement, an equal amount by volume of sand and gravel or crushed stone and not more than six gallons of water which is free of contaminants, turbidity and settleable solids.
14. Confined aquifer: An aquifer in which the groundwater is under pressure greater than atmospheric pressure. The static water level in a well tapping a confined aquifer rises to level above the top of the aquifer.
15. Crushed stone: Class A road stone (predominantly limestone) well graded with six to sixteen percent fines which will pass a 200 sieve.
16. Department: Means the Department of Natural Resources created under Iowa Code Section 455A.2.
17. Designated agent: A person other than the state, designated by a county board of supervisors to review and confirm that a well has been properly plugged.
18. Director: The director of the department.
19. Filling materials: Agricultural lime, soil, sand, gravel, crushed stone and pea gravel used to occupy space between and below sealing materials in abandoned wells being plugged.
20. Frost pit: A sunken area located directly over or within four feet of a well and used to house the equipment for discharging water from a well into the water system.
21. Graded bentonite: Bentonite which is crushed and sized for pouring and easy handling. Like processed bentonite, it swells when hydrated with water and will form a plastic, essentially impermeable mass.
22. Gravel: Class B stone screened from river sand or quarried, and of such size as will pass a two and one-half inch screen 100 percent and be retained 100 percent on a three-quarter inch screen.
23. Groundwater: Any water beneath the surface of the earth.
24. Grout: Means, for the purposes of this chapter, a fluid mixture of cement and water (neat cement); sand, cement and water (sand cement grout) or bentonite and water (bentonite grout or slurry) of a consistency that can be forced through a pipe and placed as required.
25. Limestone: Sedimentary rock which contains greater than 50 percent calcium carbonate and has a strong reaction with hydrochloric acid (HCl).
26. Neat cement: A mixture of one sack (94 pounds) of portland cement to not more than six gallons of water which is free from contaminants, turbidity or settleable solids. Bentonite up to 2 percent by weight of cement may be added to reduce shrinkage.
27. Owner: The titleholder of the land where an abandoned well is located.

28. Pea gravel: Gravel sized from one-eighths inch in diameter.
29. Plug: The closure of an abandoned well with plugging materials by procedures which will permanently seal the well from contamination by surface drainage and permanently seal off the well from contamination into an aquifer. This involves the proper application of filling and sealing materials.
30. Processed bentonite: Bentonite which has been kiln dried and processed into pellets for direct use in well sealing applications or into powder or coarse granules for use in bentonite grout for sealing.
31. Registered water well contractor: A water well contractor registered with the department in accordance with section 567 – Chapter 37, Iowa Administrative Code.
32. Sand: Clean, medium textured quartz (concrete sand) and shall be at least 25 percent with diameters between 2.0 and 0.25 mm, less than 35 percent with diameters between 0.25 and 0.05 mm and less than five percent with diameters between 0.002 and .05 mm.
33. Sandpoint well: A small diameter water well constructed by joining a screened drive point with lengths of pipe and driving the assembly into a shallow sand and gravel aquifer.
34. Sand cement grout: A mixture of one sack (94 pounds) of portland cement, an equal amount by volume of sand and not more than six gallons of water which is free from contaminants, turbidity and settleable solids.
35. Sealing: The proper placement of sealing materials into an abandoned well to seal off flow into, out of or between aquifers.
36. Sealing materials: Bentonite products. Sealing materials may also include neat cement, sand cement grout and concrete.
37. Standby well: A water well which is temporarily taken out of service with the expectation of being returned to service at a future date.
38. Static water level: The water level in a water well or aquifer when the well is not flowing or being pumped; sometimes referred to as the water line.
39. Tremie pipe: A device, usually a small diameter pipe, that carries grouting materials to the bottom of the hole and which allows pressure grouting from the bottom up without introduction of air pockets.
40. Unconfined aquifer: An aquifer in which the static water level does not rise above the top of the aquifer, i.e., the pressure of the water in the aquifer is approximately equal to that of the atmosphere.
41. Water well: An excavation that is drilled, cored, bored, augured, washed, driven, dug, jetted, or otherwise constructed for accessing groundwater.

#### **41.03 ABANDONED WELL PLUGGING SCHEDULE.**

1. Class 1 wells abandoned prior to the effective date of this rule must be properly plugged by July 1, 1995.

2. Class 2 wells abandoned prior to the effective date of this rule must be properly plugged by July 1, 2000.
3. Class 3 wells abandoned prior to the effective date of this rule must be properly plugged by July 1, 2000.
4. All classes of wells abandoned prior to the effective date of this rule and located less than 200 feet from an active well supplying potable water, or located less than 660 feet from a point source of potential contamination which may include, but is not limited to, industrial waste sites; uncontrolled hazardous waste sites; petroleum storage areas; hazardous waste treatment, storage, or disposal areas; agricultural chemical storage areas; animal feedlots; and wastewater treatment facilities, must be properly plugged by July 1, 1993.
5. All classes of wells which are abandoned on or after the effective date of this rule must be properly plugged within 90 days of the date of abandonment.

#### **41.04 ABANDONED WELL OWNER RESPONSIBILITIES.**

1. The owner is responsible for insuring the abandoned well is plugged.
2. It is the responsibility of the owner to certify, on DNR Form 542-1226, Affidavit of "Well Plugging", that an abandoned well has been plugged in accordance with the requirements and time schedule contained in this Chapter. This affidavit must include confirmation of a water well contractor. Within 30 calendar days of the date the plugging was completed, the owner shall submit to the department a copy of said form, bearing the "as recorded" certification of the County Recorder.

#### **41.05 ABANDONED WELL PLUGGING MATERIALS.**

1. Approved sealing materials are bentonite products (graded bentonite, bentonite pellets and bentonite grout), neat cement, sand cement grout and concrete.
2. Approved filling materials include agricultural lime, soil, sand, pea gravel and crushed stone. The filling materials shall be free of debris, foreign matter and any toxic or agricultural chemical residue. Filling materials are not required for well plugging.

#### **41.06 ABANDONED WELL PLUGGING PROCEDURES.**

1. Abandoned wells must be checked before they are plugged in order to ensure there are no obstructions that may interfere with plugging operations. Drop pipes, check valves, pumps, and other obstructions shall be removed if practical.
2. Class 1 wells may be plugged by pouring filling and sealing materials from the top of the well or by using tremie pipes, except for sand cement grout or concrete placed below the static water level, which must be placed by tremie pipe or dumb bailer.
3. Filling materials of sand, gravel, crushed stone, pea gravel or agricultural lime shall be placed up to one foot below the static water level; soils are not permitted below the static water level due to naturally occurring bacteriological, organic, and inorganic contaminants. A minimum of one foot of bentonite pellets, graded bentonite or neat cement shall be placed on top of the filling material up to the static water level as a seal. Sand cement grout or concrete applied with a tremie pipe or dump bailer also may be used on top of the filling material up to the static water level and in standing water above

the static water level to act as a seal. Filling material may then be added up to four feet below the ground surface.

4. It is preferable that the filling materials be omitted and that sealing materials be used to fill the entire well up to four feet below the ground surface. Sand cement grout or concrete shall be placed with a tremie pipe or dump bailer when used below the static water level. The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of four feet below the ground surface and shall be capped by a minimum of one foot of bentonite pellets, graded bentonite, neat cement, sand cement grout or concrete. The cap shall extend six or more inches beyond the outside diameter of the top of the remaining well casing and shall terminate three feet below the ground surface. The remaining three feet (below the ground surface) shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.
5. In Class 2 wells other than bedrock wells, filling material consisting of sand, gravel, crushed stone or pea gravel shall be placed in the bottom of the well up to four feet below the static water level. A minimum of four feet of sealing materials consisting of any bentonite products or neat cement shall be added above the filling material up to the original static water level. If bentonite grout or neat cement is used, it shall be placed by tremie pipe. If graded bentonite or bentonite pellets are used, they may be added by pouring in place and agitating to avoid bridging. Sealing materials shall be added above the static water level up to four feet below the ground surface.
6. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout or concrete terminating four feet below the ground surface. It is preferable that the filling materials be omitted and that sealing materials be used to fill the entire well up to four feet below the ground surface.
7. Casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of four feet below the ground surface. The remaining four feet shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.
8. In Class 2 bedrock wells, if the details of well construction are unknown, the well shall be tremied full of neat cement or bentonite grout up to four feet below the ground surface. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout or concrete terminating four feet below the ground surface.
9. The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of four feet below the ground surface. The remaining four feet shall then be backfilled with soil and the surface shall then be graded to divert water away from the abandoned well location.
10. In bedrock wells completed in a single confined aquifer, a bridge plug or packer shall be placed at or below the bottom of the casing to stop the flow of water where the pressure in the confined aquifer causes the water to flow from the well to the surface. In such cases, filling materials shall be placed in the lower portion of the well before the bridge plug or packer is set.
11. Filling material consisting of pea gravel, crushed stone or gravel shall be placed from the bottom of the well up to ten feet below the bottom of the casing or confining layer, whichever is lower. Sealing materials consisting of any bentonite products, sand cement grout or neat cement shall be placed from the top of the filling material to at least ten feet

above the bottom of the casing or confining layer or to the static water level, whichever is higher.

12. If bentonite grout, neat cement or sand cement grout is used, it shall be added by pouring in place and agitating to avoid bridging. The casing shall then be filled up to four feet below the ground surface with sealing materials. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout or concrete terminating four feet below the ground surface.
13. It is preferable that the filling materials be omitted and that approved sealing materials be used to fill the entire well up to four feet below the ground surface.
14. The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of four feet below the ground surface. The remaining four feet shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.
15. In bedrock wells completed in a single unconfined aquifer, the plugging procedure for these wells is the same as for bedrock wells completed in a single confined aquifer, except that a bridge plug or packer is not required to stop the flow of water since this problem will not exist in this type of well.
16. With bedrock wells completed in multiple aquifers, for the lowest aquifer, filling material consisting of pea gravel, crushed stone or gravel shall be placed from the bottom of the well up to ten feet below the bottom of the casing or confining layer, whichever is lower.
17. Neat cement tremied in place shall then be placed as a sealing material on top of the fill and extend upward at least twenty feet. Sealing materials shall then be placed in at least the top ten feet of each subsequent aquifer and extend at least ten feet into the confining layer or casing above. The same type of filling materials and sealing procedures shall apply for each subsequent aquifer.
18. Filling material may be placed from the top of the uppermost aquifer seal up to the static water level of the well. The casing shall then be filled with approved sealing or filling materials to four feet below the ground surface. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout, or concrete terminating four feet below the ground surface.
19. It is preferable that the filling materials be omitted and approved sealing materials be used to fill the entire well up to four feet below the ground surface. Sand grout or concrete shall be applied with a tremie line or dump bailer when applied below the static water level.
20. The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of four feet below the ground surface. The remaining four feet shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.
21. In Class 3 wells, the preferred method of plugging a sand point well is to pull the casing and sand point out of the ground, allowing the hole to collapse and fill. If the sand point and casing cannot be extracted, they shall be tremied full of neat cement or completely sealed with bentonite products.
22. The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of four feet below the ground surface. The remaining four feet shall then be

backfilled with soil and graded so that surface water is directed away from the abandoned well location.

**41.07 DESIGNATED AGENT.**

1. The Buchanan County Board of Supervisors shall appoint an individual to be responsible to review and confirm an abandoned well to be properly plugged, as required by this regulation. The designation is effective upon notification by the department by the chairperson of the Board of Supervisors. This notification will include the identity of the designated agent and the length of appointment. Changes in a designated agent will require new notification by the chairperson to the department.

**41.08 DESIGNATION OF STANDBY WELLS.**

1. A standby well must be disinfected prior to being taken out of use for a long period of time and must be disinfected and, as a minimum, checked for bacteria and nitrates when placed back in service. Disinfection of standby wells shall be done in accordance with AWWA (American Water Works Association) Standard A100. The well must not be subject to contamination by surface drainage or from other causes, and the well casing must be provided with an airtight cover when the well is not in use.
2. Nothing in these rules shall be construed as exempting public water supply wells from requirements set forth in the Environmental Protection Commission rules, 567-Iowa Administrative Code.
3. In accordance with Iowa Code Section 4455B.181, a variance to these rules may be granted by the department provided sufficient information is submitted in writing to the department to substantiate the need for a variance and assure the protection of all aquifers penetrated by the affected well.
4. When satisfactory justification has been submitted to the director substantially demonstrating that a variance to these rules will result in equivalent effectiveness or improved effectiveness, a variance to these rules may be granted by the director.
5. A denial or a variance may be appealed to the Environmental Protection Commission pursuant to 567-Chapter 7, Iowa Administrative Code.