

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CONSTRUCTION SPECIFICATIONS**  
**WATER WELL DECOMMISSIONING**

**1. Scope**

The work shall consist of all construction operations and furnishing all materials for the complete decommissioning of the water well according to the construction plans.

**2. Location**

Location of the water well shall be as specified in the construction plans or as staked in the field.

**3. Materials**

Sealing materials shall meet the requirements in American Society for Testing and Materials (ASTM) D 5299.

Fill material shall be clean and free of organic or other foreign matter. The gradation shall be such that bridging will not occur during placement. Coarse sand or fine gravel may be used as fill material to plug the well, provided that the well is cased and completed in a single, unconfined aquifer.

Cement grout shall consist of one 94-pound bag of Portland cement, an equal volume of sand, and 5 to 6 gallons of clean water.

Bentonite grout consisting of water and sodium bentonite clay containing high solids shall be mixed in accordance with the manufacturer's recommendations to achieve a weight of not less than 9.4 pounds per gallon of mix. Sodium bentonite pellets, tablets, or granules may be used provided that, when hydrated, they create a permanent and impervious material as specified in [Kansas Administrative Regulations \(K.A.R.\) 28-30-2](#).

Household chlorine bleach at 5 percent concentration of chlorine can be used in the ratio of 1 gallon bleach per 500 gallons of water.

All sand and gravel used in plugging abandoned domestic or public water supply wells shall be chlorinated prior to placement into a well. Furthermore, sand, gravel, or other materials used in wells formerly producing groundwater from an unconfined aquifer shall be washed and shall be approved by the Kansas Department of Health and Environment. Generally, this approval will be given for aggregate up to 1 inch in diameter.

**4. Well Preparation**

The well shall be cleared of all pumping equipment, valves, pipelines, casings (if possible), liners, screens, grease, oil, scum, debris, and other foreign materials as explained in ASTM D 5299, part 7.3.8.

**5. Disinfection**

Before sealing, the entire column of well water shall be treated with sufficient chlorine to produce at least a 100 parts per million (ppm) concentration within the well bore. After being agitated in the well water, the chemical solution shall be left for no less than 24 hours to ensure complete disinfection. **Household chlorine bleach at 5 percent concentration of chlorine can be used in the ratio of 1 gallon bleach per 500 gallons of water. Table 1 may be used to determine well volumes for various well bore diameters.**

**Table 1 – Well volumes**

Hole Diameter (inches)	Volume (per foot of depth)	
	(gallons)	(cubic feet)
4	0.7	0.1
6	1.5	0.2
8	2.6	0.3
10	4.1	0.5
12	5.9	0.8
14	8.0	1.1
16	10.5	1.4
20	16.4	2.2
24	23.6	3.1
36	53.0	7.1
48	94.2	12.6
60	146.9	19.6
72	211.5	28.3
96	376.0	50.3

## 6. Installation

A metal or plastic pipe shall be used to transmit well plugging materials from the ground surface to the desired depth of application. The diameter of the pipe shall be at least 3 times the diameter of the largest particle size of the plugging materials. The conductor pipe, also known as a tremie pipe, will prevent segregation and possible bridging of the plugging materials as they are transmitted into the well bore.

**Abandoned well in an unconfined aquifer**—Use the following procedure to install the plugging materials:

- Excavate and cut off the well casing to a depth of 3 feet below the ground surface.
- Fill the well with clean sand and gravel up to the static water level.
- From the static water level to 6 feet below the ground surface, the well may be filled with either compacted clay soils or an approved grout.
- A 3-foot thick grout plug shall then be placed from 6 feet to 3 feet below the ground surface.
- From 3 feet below the ground surface to the ground surface, the plugged well shall be covered with compacted silt or clay soils.
- In lieu of the above steps, fill the well completely from the bottom of the well to 3 feet below the ground surface with cement or bentonite grout and then backfill the well with surface soils from 3 feet to the ground surface.

**Abandoned well in a confined aquifer or a well that penetrates both a confined and unconfined aquifer**—Use the following procedure to install the plugging materials:

- Excavate 3 feet below the ground surface and cut off casing 3 feet below the ground surface.
- Using a conductor pipe, fill the well with at least 20 feet of grouting material extending from the bottom of the well to at least 10 feet above the bottom of the well casing.
- Using an appropriate method to prevent bridging, fill the well with clean sand or gravel from the grout plug to the bottom of the confining formation.

- From the bottom of the confining formation, place a 10-foot thickness of grouting material within the well bore, thereby forming a grout plug to prevent migration of water from the confined aquifer.
- From the top of the grout plug in the preceding step, place clean sand or gravel to the bottom of the next confining layer or to the static water level (whichever comes first). However, the sand or gravel fill must not extend higher than 13 feet below the ground surface. If the static water level is greater than 13 feet below the ground surface, compacted clay soil may be used to fill the well from the static water level to the 13-foot depth.
- A grout plug at least 10 feet in length shall then be placed from at least 13 feet below the ground surface to the top of the cutoff casing.
- From 3 feet below the ground surface to the ground surface, the plugged well shall be covered with compacted silt or clay soils.
- In lieu of the above steps, fill the well completely with cement or bentonite grout from the bottom of the well to 3 feet below the ground surface and then backfill the well with surface soils from 3 feet to the ground surface.

**For a large diameter dug well**—Use the following procedure to install the plugging materials:

- Knock down the top 5 feet of the well lining material and let it fall into the well.
- Fill the well with clean sand or gravel up to the static water level.
- Fill the remaining space from the static water level up to within 5 feet of the ground surface with compacted clay soils.
- Using a cement or bentonite grouting material, place a minimum 0.5-foot thick plug above the clay soil backfill.
- Fill the remainder of the well to the ground surface with compacted surface soils.

**The ground surface at the sealed well site shall be mounded and graded in a manner that prevents ponding of surface water.**

Waters from 2 or more aquifers shall be separated from each other by sealing the bore hole between the aquifers with grout.

## **7. Workmanship**

Criteria for all purposes shall conform to decommissioning procedures presented in ASTM D 5299.

## **8. Construction Details**