

10 CSR 23-3.110 Plugging of **Water** Wells

Bold is proposed new language; Italics with [] is proposed language to remove

PURPOSE: This rule establishes criteria for the proper plugging procedures to be followed when *[abandon]***plugging** a **water** well. Plugging procedures for monitoring wells are contained in 10 CSR 23-4.080, for heat pump wells in 10 CSR 23-5.080 and for test holes in 10 CSR 23-6.050.

[Editor's Note: This rule was originally filed as part of 10 CSR 23-3.020 General Protection of Groundwater. It is proposed as a separate rule because of added emphasis given to abandonment procedures in the amendment to the law.]

(1) Any well **that** *[which]* is *[to be]* abandoned must be plugged in accordance with these rules.

If a well has been determined to present a **contamination** threat to groundwater, the **department** *[division]* may order that the well be *[permanently]* plugged. If a well is in such a state of disrepair *[(such as the pump has been removed or the water line disconnected)]* that continued use for purposes of obtaining groundwater is impractical and the well has not been in use for a period of two (2) years or more, the **department** *[division]* may order that the well be *[permanently]* plugged. **A landowner shall report to the department any unplugged abandoned wells existing on his/her property. A permittee shall report to the department any unplugged abandoned wells existing on property that the permittee was hired to perform work under these rules.**

(2) **General Plugging Requirements.** *[Permanent Abandonment of Wells.]*

(A) *[Plugging the Well.]* **The permittee shall be responsible for plugging a well when the permittee improperly locates, constructs or completes the well or if the well is a dry hole. Otherwise, the landowner shall be responsible for the plugging of the well.**

(B) **Landowners may plug their own wells located on property they own or lease, if the wells were intended for use only in single-family houses that are their permanent residences, or were intended for use only for farming purposes on their farms, and where**

the waters that were produced were not intended for use by the public or in any residence other than their own. If the department makes a finding that certain unusual conditions or a high potential for groundwater contamination exists at a well, the department may require that the well be plugged by a permitted contractor. Unusual conditions may include, but are not limited to, a liner in the well, foreign objects stuck in the well, contamination with pollutants other than bacteria, or other conditions determined by the department.

(C) A permittee or landowner who plugs any well shall report the plugging information to the department on a plugging registration form with the appropriate fee within sixty (60) days of plugging.

(D) [1.] A well that is to be [permanently] plugged [abandoned] shall be disconnected from the water distribution system and the bore hole sealed [filled] to prevent contaminants [contaminating materials] from entering an aquifer or prevent [the subsurface water-bearing formations and] groundwater from one (1) aquifer mixing with that of another aquifer. Bentonite or cement [grout] shall be used as [for] grouting material. [If the well is so large that the use of these materials is not practical, the division will determine a proper plugging schedule.] All materials, debris and obstructions that may interfere with plugging operations shall be removed from the well. Liner pipe shall be removed or perforated **if removal is not possible, [when necessary] to **ensure** [assure] placement of an effective **grout** plug.**

(E) [2.] For all contaminated wells, except those with bacteriological contaminants, [T]the department [division] must be consulted for plugging specifications. [instruction in case of abandonment of a contaminated well or where there is a question of proper procedure.]

Sampling of the fluids in the well may be required. A permitted *[well installation or pump installation]* contractor must *[be utilized to]* plug the well.

[(B) An abandoned well shall be plugged by one (1) of the following methods in this section in accordance with the materials penetrated, in such a manner as to prevent it from acting as a channel for pollution. A report of the method of plugging shall be filed with the division on a registration report form that is provided by the division.]

(C) Plugging requirements contained in 10 CSR 23-3.010--10 CSR 23-3.100 do not pertain to bedrock irrigation wells and public water supply wells which include community, noncommunity and nontransient noncommunity type wells. Plugging requirements for these types of wells will be determined on a case-by-case basis by the division and must be performed by a permitted contractor, and may be more stringent than those for domestic and multifamily wells.

(3) Specific Plugging Requirements

(A) Any well, except high-yield bedrock or public water supply wells, may be plugged by filling the well full length with cement slurry, bentonite (chip or pellet form), bentonite slurry, or other approved grout by one of the following methods: tremie, reverse tremie, gravity (see 10 CSR 23-3.110(3)(D)(6)) or pressure. The top portion of the casing must be removed and the excavated area must be filled as required by well type in the following specifications.

(B) [1.] Hand dug wells and bored wells less *[no deeper]* than eighty feet (80') in depth must be plugged according to *[. To plug this type of well,]* the following procedure *[steps must be followed]* (see Figure 9):

1[A]. Remove the *[all]* pump[s], pipe, debris and surface covering[s] *[or concrete cap];*

2[B]. Remove at a minimum the [Push in] top one foot (1') of well lining unless the well is located in an agricultural setting where the removal of well lining must be three feet (3') below ground surface. [of well lining.] Lining may be composed of rock, brick or tile; [. If lining is composed of any other material consult the division for further instructions;]

3. Disinfect the well. If water is in the well, chlorine must be added to the water according to Table 1 in 10 CSR 23-3.050. If no water is in the well, disinfect the fill material as it is placed into the well;

4. Fill the well from total depth to within one foot (1') or three feet (3'), if in an agricultural setting, from ground surface with clean fill; and

[C. Fill well to within three feet (3') from the surface with clean fill such as gravel, sand, varied sized agricultural lime or other approved material;]

[D. Disinfect fill material. If there is water in the well, chlorine must be added to bring its concentration to at least one hundred (100) parts per million (ppm) (see Table 1 in 10 CSR 23-3.050). As the fill material is poured into the well, it is disinfected as it comes in contact with the chlorinated water. If there is no water in the well to be plugged, disinfect the fill material before it is placed into the well;]

5[E]. Fill the remaining hole with clay or clay-rich soil. Soil should be mounded slightly at the top to help offset settling. [; and]

[F. Submit the registration report form and fee to the division.]

(C) [2.] [Wells completed in] [u]Unconsolidated material wells, which [deposits. This type of well] includes, but is not limited to, alluvial wells[,] and glacial drift wells. [and nonbedrock wells.] To plug this type of well, the following steps must be followed:

1 [A]. Remove the [all] pump[s], pipe and debris from well;

2[B]. *[Dig around casing and]* **R[re]move the top two [three] feet (2' [3']) of casing unless well is located in an agricultural setting where removal of casing must be three feet (3') below ground surface.** The **excavated area [remaining hole]** must be at least two feet (2') in diameter larger than the existing casing (see Figure 10). **If the well casing is surrounded by a concrete pad or asphalt, the casing may be cut off flush;**

3. Disinfect the well. If water is in the well, chlorine must be added to the water according to Table 1 in 10 CSR 23-3.050. If no water is in the well, disinfect the fill material as it is placed into the well;

4. Fill the well from total depth to fifty feet (50') from ground surface with clean fill; and *[C. Fill well from total depth to fifty feet (50') from surface with clean fill such as gravel, sand, varied sized agricultural lime or other approved material;]*

[D. Disinfect fill material. If there is water in the well, you must add chlorine to the water bringing it to a concentration of at least one hundred (100 ppm) (see Table 1 in 10 CSR 23-3.050). As the fill material is poured into the well, it is disinfected as it comes in contact with the chlorinated water. If there is no water in the well to be plugged, disinfect the fill material before it is placed into the well;]

5.[E.] Place a grout plug that fills the upper fifty feet (50') of the well [casing] and extends into the [larger] excavated area, at least one foot (1') above the casing. In agricultural or yard settings the *[remaining hole]* **excavated area** above the grout plug must be filled with soil. *[In other settings, the remaining hole]* **Clean fill may be used to fill the excavated area** above the grout plug *[may be filled with clean fill]* if the well site is to be paved. **If the well casing is surrounded by a concrete pad or asphalt, the top one foot (1') of casing above the grout plug must be filled with cement grout or quick-setting concrete. [; and]**

[F. Submit registration report form and fee to the division.]

(D)[3.] [Wells completed in] [b]Bedrock wells, [. This type of well] **which include[s] any domestic **or multi-family** well that produces water from bedrock aquifers (see Figure 11). To plug this type of well, the following steps must be followed:**

1[A]. Remove **the** [all] pump[s], pipe and debris from well. Any liner must be removed or perforated if **removal is not** possible;

2[B]. *[Dig around casing and]* **R[r]emove the top two [three] feet (2' [3']) of casing unless the well is located in an agricultural setting where removal of casing must be three feet (3') below ground surface.** The **excavated area** *[remaining hole]* must be at least two feet (2') in diameter larger than the existing casing (see Figure 10).*[:]* **If the well casing is surrounded by a concrete pad or asphalt, the casing may be cut off flush. If the top two feet (2') of casing cannot be removed due to encountering bedrock or hard impervious material when digging around the casing, cut the casing off at the top of bedrock or impervious material.**

3. Disinfect the well. If water is in the well, chlorine must be added to the water according to Table 1 in 10 CSR 23-3.050. If no water is in the well, disinfect the fill material as it is placed into the well;

4. Fill the well from total depth to fifty feet (50') from below the bottom of the casing with clean fill; and

[C. Fill well from total depth to fifty feet (50') below bottom of casing with clean fill, such as gravel, sand, varied sized agricultural lime or other approved fill material;]

[D. Disinfect fill material. If there is water in the well, you must add chlorine to the water bringing it to a concentration of at least one hundred (100) ppm (see Table 1 in 10 CSR 23-3.050). As the fill material is poured into the well, it is disinfected as it comes in contact with the

chlorinated water. If there is no water in the well [to be plugged], disinfect any fill material used before it is placed into the well;]

5.[E.] Place a grout plug [cement or bentonite] from a point fifty feet (50') below the bottom of the casing **that: [to two feet (2') from the face making sure the grout extends into the excavated area at least one foot (1') If the water level is above a point fifty feet (50') below the bottom of the casing, then bentonite chips must be used or the cement or bentonite slurry must be emplaced through a tremie pipe lowered through the water level to the top of the fill. Under no circumstances may cement or bentonite slurry be poured through large columns of water without the use of a tremie pipe (see paragraph (2)(C)6. for alternative cement plugging technique);]**

A. extends into the excavated area at least one foot (1') above the casing; or

B. if the well has greater than eighty feet (80') of casing extends into the casing at least thirty feet (30'). From this point to within fifty feet (50') of ground surface, clean fill may be used. From fifty feet (50') to within two feet (2') of ground surface, the casing must be filled with grout, making sure the grout extends into the excavated area at least one foot (1).

[F. May plug the well, if the well has one hundred fifty feet (150') or more of casing, by filling the well with clean aggregate to a point fifty feet (50') below the bottom of the casing. , As clean fill is being placed into a well, periodic measurements should be taken to ensure that the fill does not reach a point closer than fifty feet (50') below the bottom of the existing casing. If fill is placed above this point, plugging schedules will be determined by the division and may result in removal of fill material. placing a grout plug from this point extending up into the casing thirty feet (30'). From this point to within fifty feet (50') of the surface, clean aggregate fill may be

used. From fifty feet (50') to two feet (2') must be filled with grout, making sure the grout extends into the excavated area at least one foot (1').]

6. If one hundred feet (100') or more of water is in the well, the grout plug must be emplaced by the use of a tremie pipe, pumping with a tremie pipe or using the reverse tremie method. For reverse tremie, the cement slurry must be poured in one (1) continuous operation. In any method, the tremie pipe must be no greater than twenty feet (20') from the bottom of the well or the top of the fill material. If less than one hundred feet (100') of water is in the well, the grout may be gravity fed at any depth.

7.[G.] The excavated area above the grout plug must be filled with soil. *[Cut casing off at top of bedrock if bedrock is encountered when digging around the casing, and fill remaining hole with cement slurry]. [In agricultural or yard settings, the plug must terminate at least two feet (2') below the finished surface grade and the remaining hole filled with soil.] [In other settings,*

Clean fill may be used to fill the excavated area above the grout plug if the well site is to be paved. [the remaining hole may be filled with clean fill if the well site is to be paved; and] If the well casing is surrounded by a concrete pad or asphalt, the remaining top one foot (1') of casing must be filled with cement grout or quick-setting concrete. If the casing was cut off at the top of bedrock or impervious material, the top one foot (1') of casing must be filled with cement grout or quick-setting concrete.

[H. Submit registration report form and fee to division.]

(E)[4.] For [those] wells that have an unknown [which] casing depth, [water level and total depth are not known and cannot be determined,] the well must be plugged full length as specified in (3)(A) of this section. [plugging instructions will be determined on a case-by-case basis and may be more stringent.]

(F) High-yield bedrock and all public water supply wells must be plugged by a permitted contractor using the appropriate plugging method listed in Figure 12.

[5. As clean fill is being placed into a well, periodic measurements should be taken to ensure that the fill does not reach a point closer than fifty feet (50') below the bottom of the existing casing. If fill is placed above this point, plugging schedules will be determined by the division and may result in removal of fill material.]

[6. When plugging a well that contains water that is above a point of fifty feet (50') below the bottom of the casing or liner, whichever is deeper, cement slurry may be poured into the well if a tremie pipe is placed in the well to near the bottom and acts as a conduit for the water to escape through as the cement slurry is poured into the well casing from the surface. The cement slurry must be poured in one (1) continuous operation. Mixing small batches and pouring is not permitted.]

[7. The flow in a flowing well shall be confined, if possible, and the well plugged in accordance with well plugging requirements supplied by the division which will be determined on a case-by-case basis. Proper judgment shall be exercised in the feasibility of plugging flowing wells. In some cases the confining formation may have been so badly disturbed that plugging may only cause the flow to discharge in a less appropriate location. In other situations, the flow may have eroded so much material that the landscape has taken on the appearance of a natural spring. The plugging in this case may be impractical, if not impossible.]

[(3) Owners Responsibility for Plugging Well. The owner shall be responsible for the permanent plugging of an abandoned well except when the permittee improperly locates, constructs or completes the well. The permittee shall then be responsible for the plugging of the well.]

[(4) Wells Abandoned by Landowners. Wells abandoned by landowners after August 28, 1991, shall be plugged or cause to be plugged, in accordance with this rule. Landowners may plug their own wells located on property they own or lease, if the wells were intended for use only in single-family houses which are their permanent residences, or were intended for use only for farming purposes on their farms, and where the waters that were produced were not intended for use by the public or in any residence other than their own. If a landowner pays someone to assist with the plugging of the well, that person must hold a current Missouri well installation contractor permit or Missouri pump installation contractor permit except as stated in 10 CSR 23-1.090(2) concerning hand dug wells. If the division makes a finding that certain unusual conditions exist at a well that is to be plugged, the division may require that the well be plugged by a permitted well installation contractor or a permitted pump installation contractor. Unusual conditions exist at a well that is to be plugged if the total depth, amount of casing and water level are not known; a liner is in the well; foreign objects are stuck in the well; the well is contaminated with pollutants other than bacteria; or other conditions determined by the division on a case-by-case basis.]

[(5) A permittee or landowner who permanently abandons any well that is removed from service shall report the abandonment to the division on a registration report form provided by the division. A permittee or landowner shall report to the division any unplugged abandoned wells existing on his/her property (landowner) or property on which a permittee is hired to perform well drilling repair or pump installation.]

[(6) All wells may be plugged by filling the well via tremie or pressure grouting with cement slurry, bentonite or bentonite slurry from total depth to two feet (2') from the surface, if this method exceeds other minimum standards.]

[(7) If the division finds that certain conditions for high potential of groundwater contamination exist at a well, the division may require that a permitted well installation contractor or pump installation contractor be contracted to plug the well.]

DRAFT