3745-9-10 **Abandoned well, test hole, dry well sealing.**

(A) An abandoned well, test hole, or dry well shall be sealed in accordance with this rule and rule 3745-9-07 of the Administrative Code.

(1) "The State of Ohio Regulations and Technical Guidance For Sealing Unused Water Wells and Boreholes" shall be used as a guide.

(2) Plan approval is not required in accordance with Chapter 3745-91 of the Administrative Code to seal an abandoned well, test hole or dry hole. A public water system may apply to the director for a variance from this rule in accordance with rule 3745-9-02 of the Administrative Code.

(B) A test hole shall either be permanently sealed or converted into a well upon completion of testing.

(C) An abandoned well shall be sealed in accordance with the following:

(1) All obstructions shall be removed from the abandoned well, including the pump and related equipment, drop pipe, pitless adapter, suction line, trash or other debris. Unless permanently attached, all liner pipe shall be removed from the well prior to placement of sealing materials.

(2) Casing shall be removed, ripped or perforated, or with prior consultation with the district office the casing may be left intact or in place.

(a) Casing shall be removed to a depth of at least three feet below ground surface, except for a dug or bucket augered well covered by paragraph (C)(13)(b)(ii) of this rule. The remaining borehole shall be filled with clean clay.

(b) If possible, casing shall be removed by overdrilling when the annular seal is inadequate, or water is flowing from around the outside of the casing, or gravel packing connects two or more hydraulic zones.

(3) Where evidence of microbiological growth is present, an abandoned well shall be disinfected by slowly wetting the casing or borehole with a solution of sodium hypochlorite or calcium hypochlorite. Disinfectant concentration in the water column shall be at least fifty milligrams per liter total chlorine.

(a) Disinfectant shall have standard ANSI/NSF 60 certification.

(b) Contact of disinfectant with bentonite shall be avoided.

(4) Cement grout may be gravity poured into a dry hole where no water is present.

(5) After the sealing material and grout have been placed into the abandoned well, the grout shall cure a minimum of twelve hours to assess whether any settling of the sealing material has occurred. If settling has occurred, then additional grout shall be placed into the remaining borehole.

(6) The finished grade shall ensure that surface water runoff drains away from the sealed abandoned well.

(7) An abandoned well that is less than two hundred feet deep and greater than four inches in diameter may be sealed using coarse grade bentonite.

(8) An abandoned well that is less than one hundred feet deep and greater than four inches in diameter may be sealed using pelletized bentonite or coarse grade bentonite.

(9) An abandoned well that is constructed into or through a single aquifer that is not flowing at the surface shall be sealed in accordance with the following:

(a) Clean and disinfected sand or gravel may be placed either from the bottom of the abandoned well to the top of the aquifer, or to twenty-five feet below ground surface, whichever is encountered first.

(b) An abandoned well shall be sealed by either pressure grouting, or pouring coarse grade bentonite from twenty-five feet below ground surface to the ground surface.

(c) If casing is removed, sealing material and grout shall be placed while casing is being removed from the borehole.

(10) An abandoned well that is constructed into or through multiple aquifers that is not flowing at the surface shall be sealed in accordance with the following requirements:

(a) An abandoned well shall be sealed by pressure grouting.

(b) Pelletized bentonite or coarse grade bentonite may be poured.

(c) If detailed construction and geologic data is available, then clean and disinfected sand or gravel may be placed adjacent to the aquifer zones and grout placed adjacent to the confining units. The abandoned well shall then be sealed from the top of the uppermost aquifer or from twenty-five feet below ground surface, whichever is encountered first, to the surface with either cement grout or bentonite grout.

(11) An abandoned well that is flowing shall be sealed in accordance with the following requirements:

(a) If practical, the casing may be extended until the flow of water over the top of the casing stops. An abandoned well shall be sealed by pressure grouting, or coarse grade or pelletized bentonite may be poured.

(b) If casing extension is impractical because of the hydraulic head, one of the following shall be met:

(i) An inflatable packer shall be installed at the top of the producing formation to stop or restrict the flow of water. The abandoned well shall be sealed by pressure grouting through the packer from the bottom of the hole to the bottom of the packer. The packer shall then be deflated and pressure grouting shall continue to the ground surface.

(ii) A shut-in device shall be installed at the top of the abandoned well to prevent flow. A conductor pipe shall be inserted through the shut-in device and the abandoned well shall be sealed by pressure grouting from the bottom of the hole to the ground surface.

(iii) Disinfected gravel shall be poured into the abandoned well to reduce the flow of water and the abandoned well shall be sealed by pressure grouting from the top of the aquifer, or from twenty-five feet below ground surface, whichever is encountered first.

(iv) If additives are used to increase the density of cement grout to control the flow of water, appropriate placement techniques shall be used to ensure that separation does not occur.

(12) An abandoned well drilled through fractured or cavernous formations or a mine shaft, shall be sealed in accordance with the following:

(a) The depth and thickness of the fractured, cavernous zone or mine shaft shall be determined, if possible, and the fractured, cavernous zone or mine shaft shall be sealed in accordance with the following:

(i) Where the fractured, cavernous zone or mine shaft is greater than twenty-five feet from the ground surface, a packer, shale trap, or another similar device shall be installed at the top of the fractured, cavernous zone or mine shaft and the well shall then be sealed by pressure grouting up to the ground surface. In lieu of installing a packer, shale trap, or another similar device, the fractured, cavernous zone or mine shaft may be filled with clean and disinfected gravel, or cement grout, and the abandoned well shall then be sealed by pressure grouting up to the ground surface.

(ii) Where the fractured, cavernous zone or mine shaft is less than twenty-five feet from the ground surface, the abandoned well shall be filled with cement grout with additives that promote bridging across the fractured, cavernous zone or mine shaft.

(b) The remainder of the abandoned well shall be sealed by pressure grouting.

(13) A dug or bucket auguered abandoned well that is greater than twenty-four inches in diameter and less than twenty-five feet deep shall be sealed in accordance with one of the following:

(a) The entire depth of the dug abandoned well shall be filled with concrete that meets the specifications of paragraph (B)(1)(c) of rule 3745-9-07 of the Administrative Code and the concrete mix shall not exceed aggregate sizes greater than medium sand or three-fourths inch gravel.

(b) The static water level shall be measured and the abandoned well pumped dry, if possible.

(c) If the static water level is less than five feet below ground surface, then the following apply:

(i) The abandoned well shall be filled with clean clay or cement grout to the elevation of the static water level.

(ii) The liner shall be removed to the depth of the static water level, and the borehole shall be excavated radially six inches beyond the

original borehole.

(iii) A one foot layer of bentonite or cement grout shall be placed in the abandoned well at the elevation of the static water level. If the abandoned well is dry and bentonite is used, it shall be hydrated with five gallons of water per fifty pounds of bentonite.

(iv) The remaining borehole shall be filled with clean clay to ground surface.

(d) If the static water level is greater than five feet below ground surface, then the following apply:

(i) The abandoned well shall be filled with clean clay or cement grout to the elevation of the static water level.

(ii) At least the top three feet of casing, wall or liner material shall be removed and the borehole shall be excavated radially six inches beyond the original borehole.

(iii) A one foot layer of bentonite or cement grout shall be placed in the abandoned well at the elevation of the static water level. If the abandoned well is dry and bentonite is used, it shall be hydrated with five gallons of water per fifty pounds of bentonite.

(iv) A layer of clean clay or cement grout shall be added above the grout until the level in the abandoned well is three feet below ground surface.

(v) Another one foot thick layer of bentonite or cement grout shall be added at the level at which the casing, wall or liner material was removed. If the abandoned well is dry, the bentonite shall be hydrated with five gallons of water per fifty pounds of bentonite.

(14) A dug or bucket auguered abandoned well that is greater than twenty-four inches in diameter and greater than twenty-five feet deep shall be sealed in accordance with either paragraph (C)(9) or (C)(10) of this rule.

(D) A copy of the well sealing report that is required by section 1521.05 of the Revised Code shall be submitted to the district office within thirty days of sealing a public water system well. The abandoned well location shall be clearly noted on a site map

with reference to highways, streets, corporate boundaries and local physical landmarks.

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, test methods, federal rules, and federal statutory provisions referenced in this rule, see paragraph (AA) of rule 3745-9-01 of the Administrative Code titled "Incorporation by reference."]

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