

## PROPOSED AMENDMENTS

### CHAPTER 35. WELL DRILLERS AND PUMP INSTALLERS LICENSING

#### 785:35-1-2. Definitions

The following words and terms, when used in this Chapter, shall have the following meaning, unless the context clearly indicates otherwise:

. . . [omitted for brevity]

"Fresh Water" means water which has less than five thousand (5000) parts per million total dissolved solids. All other water is salt water. [82:1020.1(7)]

. . . [omitted for brevity]

#### 785:35-3-2. Expiration and renewal of licenses and certifications

(a) **Expiration.** All licenses and operator certifications issued by the Board shall expire on June 30 of the first or second year following issuance of the license or operators certification. New licenses or operator certifications shall be issued for a one or two year period, so that all odd license numbers and associated operators certifications shall expire in odd numbered years and all even numbered licenses and associated operator certifications shall expire in even numbered years.

(b) **Renewal.** All licenses and certifications may be renewed for a period of two years, subject to the rules in this Chapter. On or before May 31 of the year the license or certification is to be renewed, except as specified in this subsection, each licensee and certified operator shall submit the following:

(1) A completed application for renewal on forms furnished by the Board with the affidavit executed by the listed contact person for the licensee, and

(2) The license or operator certification renewal fee as provided for in these rules, provided that renewal fees shall not be due for licenses and certifications issued after January 1 of the year in which the first renewal is due, and

(3) The indemnity fund fee for those activities for which the license or operator certification is valid, and

(4) The late fee if the renewal application is submitted after June 30.

(c) **Grace period.** Any licensee or operator who allows his or her license or certification to lapse will be given until July 31 of the year in which they are scheduled to renew their license or operator certification in which to renew his or her license or certification without an examination; provided however, a late fee shall be due after June 30 as set forth in 785:5-1-11. After the grace period, the application will be treated as a new application. Provided however, any licensee or operator fulfilling a military obligation shall be granted an indefinite grace period as determined by the Board.

(d) **Board action.** The Board may grant the renewal application or deny the application as provided in this subchapter of these rules.

(e) **Continuing education requirement.**

(1) Beginning July 1, 2004, completing annual continuing education shall be required before any license or operator certification will be renewed, unless otherwise specifically determined by the Board or as set forth in paragraph (8) of

this subsection. Information concerning the continuing education attended must be submitted with the application for renewal form.

(2) All licensees and all certified operators shall be required to attend at least four (4) units of approved continuing education during each year period (from July 1 through June 30) or a total of eight (8) units for each two-year period of renewal of which one unit must be comprised of an approved Oklahoma Rules and Regulations unit.

(3) Continuing education shall be required during the first full year that the license or operator certification is active and during each year the license or operator certification is renewed.

(4) One unit of continuing education shall equal fifty (50) minutes of approved instruction.

(5) Approved trade shows and exhibitions attended shall be counted as one unit.

(6) Continuing education instruction relating to well drilling and plugging and pump installation which are provided by or approved by another state's well drilling program are pre-approved for the Oklahoma continuing education requirement.

(7) Other continuing education instruction and trade shows and exhibitions will be considered for approval by the Board after information concerning the continuing education or trade show and exhibition is submitted to the Board for review. Pre-approval of continuing education, trade shows and exhibitions may be requested for any licensee or certified operator.

(8) If a licensee or certified operator fails to attend four (4) or eight (8) units as the case may be during the renewal period, the application for renewal may be approved after payment of \$250.00 in penalty and double the continuing education requirements (eight (8) or sixteen (16) units as the case may be).

### **785:35-5-3. Requirements for multi-purpose completion report**

Each licensee or certified operator as the case may be shall file a multi-purpose completion report for each groundwater well, water well test hole, fresh water observation well, monitoring well, site assessment well, geotechnical boring, or heat exchange well completed or plugged. The report shall be on forms provided by the Board and shall be filed within sixty (60) days after the date of completion or plugging. Information regarding multiple monitoring wells, geotechnical borings and heat exchange wells may be accumulated together in a single report if all of the excavations are located in the same ten-acre tract, have substantially the same lithology encountered in the subsurface, and have substantially the same depth and construction. If more than one boring or well is included on a multi-purpose completion report, a site map shall be attached to the report which indicates the distance of each well or boring from permanent reference points such as streets, roads or section lines. Provided, a report need not be filed for a geotechnical boring 20 feet deep or less in which groundwater or contamination is not present. Effective July 1, 2009, all multi-purpose completion reports shall be submitted with latitude and longitude data.

### **785:35-7-1. Minimum standards for construction of groundwater wells, fresh water observation wells, and water well test holes**

(a) **General requirements.**

(1) **Minimum standards.** The minimum standards set forth in this subchapter apply to all groundwater wells, fresh water observation wells and water well test holes whether constructed by a person having a valid license or by any other person. More stringent construction standards may be required for areas of known contamination as identified in Chapter 45, Appendix H.

(2) **Construction of wells.** Flowing and non-flowing groundwater wells, observation wells and water well test holes are to be constructed in a manner as to prevent waste and to prevent contamination of groundwater by pollution material either entering the ground around the casings or tubing, or entering the fresh groundwater from pollution sources below the ground, or by entering the fresh well water by leaking wells, casing pipe fittings, pumps, or well seals.

(3) **Proper maintenance, plugging and capping.** The well driller and/or the well owner are charged with the responsibility of taking whatever steps are reasonable in a particular situation to guard against waste and contamination of the groundwater resources, and to see that unused wells are properly capped or plugged.

(b) **Minimum location standards.**

(1) Every new groundwater well, fresh water observation well and water well test hole shall be located a minimum distance from possible pollution sources as prescribed in this subsection or as otherwise authorized by a variance granted by the Executive Director. Possible pollution sources include but are not limited to existing or proposed septic tanks, sewer lines, absorption fields or beds, seepage pits, building foundations, waste pits, lagoons, oil or gas wells, and landfills. The minimum distance between the possible pollution source and the well or test hole shall be as follows, provided that other governmental agencies may require wells to be located at distances greater than the minimum distances set forth in this paragraph:

(A) 10 feet from a closed or tight sanitary sewer line, 15 feet from aerobic (above ground) sprinkler spray, and 50 feet from an aerobic sprinkler head,

(B) 300 feet from the outside perimeter of an existing or proposed waste lagoon for a feedlot or confined animal feeding operation, and

(C) 50 feet from all other pollution sources, provided however, if the well is 50 feet to 75 feet and located down-gradient or level from a possible source of pollution, a twenty foot (20') surface seal shall be installed, and

(D) 75 feet from all other pollution sources if the well is level with the pollution source and 100 feet from all other pollution sources if the well is located down-gradient from the pollution source.

(2) If not prohibited by the owner of the well or other governmental agency requirements, groundwater wells which will not be used for drinking water may be located closer to a possible pollution source than the minimum distances specified in paragraph (1) of this subsection if all of the following conditions are met:

(A) the possible pollution source is not a wastewater lagoon and not a subsurface septic system,

(B) before the well is drilled, the well driller advises the person wanting the well drilled that the well is subject to contamination,

(C) the owner of the proposed well notifies the Board that the owner will authorize the driller to drill the well closer to the possible pollution source than the minimum location standard,

(D) the outside water-tight casing is properly cement grouted or completed with ten (10) feet bentonite in the lower one-half (1/2) portion and ten (10) feet cement grout in the upper one-half (1/2) portion at least twenty (20) feet down from the land surface or pitless adaptor connection.

(3) If a well driller or other person proposing to drill a well encounters a structure, object or other situation and is unsure whether it may be a possible source of pollution, he shall contact Board staff and obtain approval for location of the well.

(c) **Casing of groundwater and fresh water observation wells.** Except for sand point wells, requirements for casing of groundwater wells and fresh water observation wells shall be as follows:

(1) The casing shall be installed to seal off any groundwater zones containing water which does not meet the groundwater quality standards as set forth in Oklahoma's Water Quality Standards. In no case shall a well be completed in a salt water zone.

(2) New groundwater and fresh water observation wells shall have:

(A) Outside water-tight production casing cement grouted from land surface to a minimum depth of ten (10) feet below the land surface, and to such further depth as may be necessary, depending upon the character of the underground formations, to extend into an impervious stratum, where such stratum is found above the source aquifer.

(B) Casing seated at top of the first impervious stratum suitable for casing point. Where an impervious formation or tight confined bed does not occur at the well site, the casing shall be extended as far as practicable below the water table and wherever possible, at least ten (10) feet below the minimum seasonal stage of the water table.

(C) Casing joints threaded, welded, or glued with water well construction glue so as to be water-tight.

(D) Casing that extends at least ~~eight (8) inches above the natural ground level or preferably~~ twelve (12) inches above the natural ground level or eight (8) inches above the floor surface for surface pad completions. In areas where known flooding occurs, the casing shall extend twenty-four (24) inches above the maximum level of such flooding.

(E) Casing meeting or exceeding the following:

(i) new or clean and sanitary used carbon or stainless steel, or

(ii) new PVC fresh water well casing which has a S.D.R. rating of twenty-six or stronger and which may be plain end with threaded connector, and with all joints made water-tight by cleaning and cementing, using manufacturer's recommended thinner and cement for use in fresh water wells, or

(iii) fiberglass or other material which meets or exceeds N.S.F. approval for casing which is specially designed for use in a water well.

(d) **Cement grouting and concreting.** Except for sand point wells, cement grouting and concreting requirements for groundwater wells and fresh water observation wells shall be as follows. These requirements must be met before the drilling rig is taken from the site.

(1) All new groundwater wells and fresh water observation wells shall be made water-tight around the outside of the production casing by cement grouting to such depths as may be necessary to exclude pollution, but in no case shall the cement grout seals be less than ten (10) continuous feet in depth, provided that five (5) feet of bentonite may be installed immediately below five (5) feet of cement grout for the total 10 feet continuous seal. If surface pipe and production casing are used, the cement grouting and/or bentonite seal shall be installed outside the surface pipe casing in all instances beginning July 1, 2005, provided the following provisions apply:

(A) a variance may be issued by the Director for an alternative completion design due to site specific conditions, and

(B) if a sleeve is used at the surface for the sole purpose of attaching a pitless adapter, the sleeve shall be installed or embedded within the surface seal, extend a minimum of eight feet (8') below ground level in the borehole, and the surface seal shall be a minimum of one and one-half inch (1½") thick.

(C) If the surface casing does not extend twelve inches (12") above natural ground level and a pitless cap or sanitary seal is not installed, then a ten foot (10') cement grout/bentonite surface seal shall be installed in the area between the surface and production casings terminating within four feet (4') of land surface.

(2) The cement or cement/bentonite seal shall originate at a minimum ten (10) foot depth and terminate no deeper than four feet (4') from the natural land surface for a minimum total length of ten feet (10') after all settling of the cement or bentonite/cement has occurred, unless a written waiver is first obtained from the Board.

(3) The cement grout shall consist of a mix ratio of one (1) 94 pound sack of cement to a maximum of six (6) U.S. gallons of water. The cement and water must be mixed to the proper consistency as recommended by the cement manufacturer before the mixture is installed around the casing. A maximum of fifty percent (50%) aggregate by dry weight may be added to the portland cement to form the cement grout, provided the aggregate is a size that will not create a potential to cause bridging in the annular space.

(4) A maximum of twenty percent (20%) percent bentonite may be added to the slurry, which bentonite shall be prehydrated to the manufacturer's recommended consistency. Prehydration requires that the bentonite be properly mixed with the recommended amount of water before the mixture is installed.

(5) The well borehole shall be a minimum diameter of at least three (3) inches greater than the outside diameter of the well casing or production tubing adjacent to the borehole utilized in the surface seal.

(6) This annular space shall be filled with cement grout or cement/bentonite to the minimum ten (10) foot depth, or such further depth as may be necessary to exclude pollution.

(7) Where a pitless well adapter or unit is being installed, the grouting shall start below the junction of the pitless well adapter or unit where it attaches to the well casing and shall continue to at least ten (10) feet below this junction.

(8) If a high solids bentonite grout is used for the bentonite seal portion below the cement grout portion of the surface seal, the grout shall contain a minimum, twenty percent (20%) solids by dry weight.

(9) It is not an acceptable installation method to install dry cement around the casing and then add water.

(e) **Well development requirements for groundwater wells except sand point wells or fresh water observation wells.** Upon completion of the groundwater well or fresh water observation wells and before conducting the yield of drawdown tests, the well driller shall clean and develop the well to remove drill cuttings and drilling mud.

(f) **Disinfection of groundwater or fresh water observation wells.** Requirements for disinfection of groundwater or fresh water observation wells shall be as follows:

(1) All water used in the drilling of the well shall be potable water or uncontaminated chlorinated water having not less than 100 parts per million chlorine.

(2) A new, repaired, or modified well shall first be thoroughly cleaned and prepared for receiving pumping equipment.

(3) Thereafter, the well and pumping equipment shall be disinfected with chlorine so applied that a concentration of at least one hundred (100) parts per million of chlorine shall be obtained in all parts of the water in the well.

(4) A minimum contact period of two (2) hours shall be provided before pumping the well to flush chlorine solution from the fresh water distribution system.

(g) **Access port or water level measuring device.** Upon completion of a new groundwater or fresh water observation well and before the well is put into service, the well driller will equip the well with either an access port that will allow for the measurement of the depth to static water surface or a static water level measuring device.

(h) **Sand point well construction requirements.** Unless otherwise approved by variance, applicable minimum standards set forth in this section and the following minimum construction requirements apply to sand point wells:

(1) The sand point well shall be drilled to a total depth of no more than thirty feet (30'); and

(2) A pilot hole shall be constructed first, with cement installed to a depth of three feet (3') around surface casing, then the remaining bore hole can be installed then production casing installed.

#### **785:35-7-1.1. Minimum standards for construction of heat exchange wells**

(a) **General requirements.**

(1) **Applicability of minimum standards.** The minimum standards set forth herein apply to all heat exchange wells as defined in 785:35-1-2, whether constructed by a person having a valid license or by any other person. Minimum standards shall include regulation of the drilling of the borehole, installation of casing, installation of heat loop pipe, and the filling and/or grouting of the well.

Manifolding of loop pipe to complete a heat exchange system is not regulated under this Section.

(2) **Prohibition against other uses.** Heat exchange wells cannot be used for any purpose other than heat exchange. After completion, heat exchange wells shall not be converted to any other type of well except by written approval by the Board. The licensee shall ensure that the heat exchange well is constructed according to the rules.

(3) **Maximum protection of groundwater required.** Construction of geothermal and heat exchange wells shall provide maximum protection to the groundwater from contamination and movement and migration of water from one zone or aquifer to another.

(b) **Location of heat exchange wells.**

(1) A vertical heat pump well shall be located on a site so that surface water will not pool or pond around or within ten (10) feet of the heat exchange well location.

(2) Placement of a heat exchange well must meet or exceed standards as set forth by section 785:35-7-1(b) relating to location requirements for groundwater wells except as set forth in paragraph 3 of this subsection.

(3) If not prohibited by the owner of the well or other federal or state agency requirements, heat exchange wells may be located closer to a possible source of pollution than the minimum distances specified in Section 785:35-7-1(b) if all of the following conditions are met:

(A) The possible pollution source is not a wastewater lagoon.

(B) The well annulus is completely sealed as described in paragraph 7 of subsection (c) of this section.

(c) **Construction standards for vertical closed-loop exchange wells.** Vertical closed-loop heat exchange wells shall be constructed in accordance with this subsection. Site specific conditions shall be assessed to determine the best method and materials to be used for sealing and filling the well annulus to protect the groundwater. In addition, but not as an alternative, to the requirements stated in (1) through (9) of this subsection, methods and materials for construction of heat exchange wells that meet or exceed recommendations specified in "Grouting for Vertical Geothermal Heat Pump Systems Engineering Design and Field Procedures Manual", International Ground Source Heat Pump Association, Oklahoma State University, First Ed. 2000, and in "Grouting Procedures for Ground Source Heat Pump Systems", International Ground Source Heat Pump Association, Oklahoma State University, 1991, may be used for construction of vertical closed-loop heat exchange wells.

(1) **Casing material.** If permanent casing is needed in a heat exchange well, it must meet standards set out in Section 785:35-7-1 for steel and for plastic.

(2) **Heat exchange loop material.** In a closed-loop heat exchange well, the material used to make up the heat exchange loop that is placed into the ground must be equal to or exceed PE3408, DR 11, 160 PSI high density polyethylene (HDPE) or ASTM D-3350.

(3) **Connecting closed-loop pipe.** All pipe joints and fittings installed and buried shall be socket, butt or thermally fused according to the pipe manufacturer's specifications. Glued or clamped joints shall not be used below ground unless the

joint or connection serves as a service outlet and the joint or connection is not covered with earth material. Joints must not leak after assembly.

(4) **Heat transfer fluid.** The fluid used inside the closed-loop assembly must be non-toxic, food grade quality and approved for use by the U.S. Environmental Protection Agency and a release of the fluid to the groundwater must not violate Oklahoma Water Quality Standards set forth in Chapter 45, OAC 785.

(5) **Borehole size.** The hole size for heat exchange wells must be of sufficient size to allow placement of the material to surround all pipe, but in no case shall the borehole diameter be less than four (4) inches.

(6) **Grouting of vertical heat exchange wells.** Grouting and filling the annulus of a heat exchange well must be completed immediately after the well is drilled to avoid cave-in of the uncased hole.

(7) **Vertical heat exchange well sealing and filling materials and methods.** The well annulus must be completely sealed or filled the total length of the borehole with approved materials and methods as listed below.

(A) A bentonite, cementitious, or Portland cement grout seal shall be installed from a point thirty (30) feet below land surface up to the excavation trench that connects the closed loop to the heat exchange system. Spreading or expanding clips shall not be used within the top thirty (30) feet of the borehole.

(B) Approved annulus sealing and filling materials below thirty (30) feet shall include Portland cement, high solids bentonite grout (20-30% solids by weight), bentonite pellets or chips, water well filter pack sand or gravel, or approved high efficiency or thermally enhanced grouts designed for geothermal borehole.

(C) The annulus sealing or fill material shall be installed from the bottom of the borehole to a termination point of no less than thirty (30) feet from land surface.

(D) Bentonite chip or pellet fill material installed shall be hydrated immediately after installation if installed in the unsaturated zone.

(E) Fill material placed in the annulus shall be uncontaminated, provided that cuttings shall not be used as fill material.

(F) When non-slurry sealing and filling materials are used, only clean water well filter pack sand or gravel or chipped or pelletized sodium bentonite varieties that are designed to fall through standing water are acceptable when sealing the annulus of a well that is below the water level in the saturated zone. The borehole shall be flushed clean of all drilling mud and debris left over from the drilling operation so that the bentonite products designed for this type of installation will gravity feed without obstruction. Material shall be introduced in a manner to prevent bridging of the materials in the borehole annulus. A measuring device such as a tagline shall be used to measure and document placement of the materials installed.

(G) Slurry mixes of bentonite grout or Portland cement shall be installed by pumping through a tremie pipe in a continuous operation using a positive displacement method. Polymer additives designed to retard swelling are acceptable for use with the bentonite grout or Portland cement. The tremie pipe will extend the full depth of the borehole before pumping begins. The borehole

diameter shall be of adequate size to allow proper placement of materials using this method. Slurry volume used must equal the annulus volume of the borehole.

(H) For air drilled boreholes in which the borehole is completely dry and the normal static water level is deeper than the total depth of the heat exchange well, the bentonite slurry may be pumped from the surface without a tremie pipe.

(8) **Multiple formations, lost circulation zones, or zones of differing water quality.** When multiple formations, lost circulation zones, or zones of differing water quality are encountered within the same borehole, the listed sealing and filling materials set forth in paragraph (7) may be used, provided, that if sand or gravel material is used as the fill material, a solid plug of Portland grout, bentonite pellets, or bentonite chips must be installed to separate the formations or zones to prevent cross contamination. The total length of the plug must be a minimum of five (5) feet and installed in a consolidated area of the borehole. If no consolidated area or formation is present to install the plug (such as loose sand or gravel), sand and /or gravel shall not be acceptable annulus fill material.

(9) **Wells drilled in lost circulation conditions.** If caves or large fractures are encountered in drilling the borehole, grouting may not be possible and the Board must pre-approve completion of the heat pump well in such conditions based on plans to bridge and seal such areas. If completion is not approved, the well must be properly plugged. Chipped bentonite or clean fill (gravel, sand and other appropriate material) may be used to seal small fractures.

(d) **Construction standards for open-loop and return heat exchange wells.**

(1) Open-loop heat exchange wells must meet the minimum construction standards set forth in Section 785:35-7-1 relating to groundwater.

(2) Water return wells for domestic heat exchange systems must meet the minimum construction requirements set forth in Section 785:35-7-1, and the groundwater used in the system must be returned to the same aquifer from which the groundwater was withdrawn by the open-loop heat exchange well, provided that authorization from the Oklahoma Department of Environmental Quality may also be required.

#### **785:35-9-1. Minimum standards for pump installation**

(a) **General requirements.**

(1) **Minimum standards.** The minimum standards set forth in this subchapter apply to the installation of all water well pumps and pumping equipment, whether installed by a person having a valid license or by any other person.

(2) **Pump installation practices.** All pump installations shall be completed in such a manner as to prevent waste and contamination of groundwater by pollution material entering the well from pumping equipment, casing connectors, fittings, piping, sanitary seals or caps.

(3) **Construction materials.** All materials used in the construction of the pumping system shall be of a type and strength to prevent waste or pollution of the groundwater of the state.

(4) **Temporary abandonment practices.** When a well is to be temporarily removed from service, the top of the well casing shall be properly sealed with a water-tight cap that cannot be easily removed.

(b) **Well casing connections.** Minimum standards for well casing connections are as follows:

(1) **Above-grade connection.** An above-grade connection into the top or side of a well casing shall be at least ~~eight inches (8")~~, but preferably twelve inches (12"), above the land surface and shall be constructed so as to exclude dirt or other foreign matter by at least one of the following methods, as may be applicable:

(A) Threaded connection;

(B) Welded connection;

(C) Rubber expansion sealer;

(D) Bolted flanges with rubber gaskets;

(E) Overlapping well cap; or

(F) If a water well pump is mounted or sealed on a concrete pedestal, the casing shall extend at least one inch (1") into the base of the pedestal and at least eight inches (8") above the land surface.

(2) **Below-grade connection.** A connection to a well casing made below ground, or less than ~~eight inches (8")~~ twelve inches (12") above the land surface, shall be protected by a pitless adapter or pitless unit. Such pitless adapters shall be installed below the frost line. A below-ground connection shall not be submerged in water at the time of installation. Holes cut in the casing through which the pitless adapters are installed must be sized and constructed so as to guarantee a watertight seal with the pitless adapter in place.

(3) **Above-grade capping.** For water wells with pitless adapters, the portion of the well casing above the land surface shall be capped with a water-tight, vented pitless adapter cap that cannot be easily removed.

(c) **Pump installation.** The minimum standards for installation of pumps and pumping systems are as follows:

(1) **Pumps and pumping equipment.**

(A) **Priming requirements.** A pump shall be designed, installed, and maintained so that priming is not required for ordinary use. Pumps installed on irrigation systems may be primed, but the priming water shall contain a chlorine residual and be clear and free of contamination. An irrigation well equipped with a centrifugal pump may be primed without chlorination when the pump is filled with water taken directly from the well.

(B) **Cross connections prohibited.** Cross connections between water wells and other systems or equipment containing substances such as wastewater, pesticides or fertilizers are prohibited unless equipped with a protective device such as a break tank or backflow preventer, which the owner agrees to install, test and maintain to assure proper operation.

(2) **Pump discharge lines.** A buried discharge line between the well casing and the pressure tank in any installation, including a deep well turbine or a submersible pump, shall not be under negative pressure at any time.

(3) **Vents.** All wells shall be vented with watertight joints terminating at least two feet (2') above the 100 year flood elevation or ~~eight inches (8")~~, but preferably twelve inches (12"), above the land surface. The casing vent shall be screened. Vents may be offset. All submersible pumps shall be installed with a vented cap on the top of the well casing or pitless unit to prevent drawing surface water, mud,

sand, or other substances into the well. Where the well casing on small diameter wells is used as a suction pipe, the casing need not be equipped with a vented cap, provided the casing is properly sealed or capped. If toxic or flammable gases are present, they shall be vented from the well. The vent shall extend to the outside atmosphere at least six (6) feet above land surface or to a point where the gases will not present a hazard. Openings in pump bases shall be sealed watertight.

(4) **Disinfection.** The well and pumping equipment shall be disinfected with a chlorine concentration of at least one hundred (100) parts per million of chlorine throughout the well. The chlorine solution shall be introduced into the well in a manner to flush the well casing surfaces above the static water level. A minimum contact period of two (2) hours shall be provided before purging and flushing the chlorine solution from the distribution system. Disinfection in a well repair operation may be accomplished at the beginning of the operation with chlorine applied to obtain a concentration of two hundred (200) parts per million for the period of the well repair operation. The water shall be purged prior to taking of water samples or use being made of the water. The licensee or operator shall be responsible for disinfecting the well, pump or pumping equipment. The well owner may pump and flush the well following disinfection, provided the owner has been instructed regarding the proper procedures by the licensee or operator.

(d) **Windmill Driven Pumps.** Surface completion must be constructed with cover plate designed to exclude pollution.

#### **785:35-11-1. Plugging and capping requirements for groundwater wells, fresh water observation wells, heat exchange wells and water well test holes**

(a) **Temporary capping.** When a groundwater well or fresh water observation well is temporarily removed from service, the top of the well casing will be properly sealed with a pitless adapter cap, sanitary well seal, or well casing cap that cannot easily be removed. A new well shall be properly capped before the well driller leaves the drilling site.

(b) **Time for plugging or completing water well test holes.** Water well test holes shall be properly plugged as provided in this section by the well driller prior to removal of drilling equipment unless the test hole is completed as an observation well for aquifer testing within three (3) days after the completion of testing or such test holes must be completed as water wells, including the installation of surface casing and cement seals, within three (3) days after the completion of testing, unless an extension of time is granted by the Board. The three (3) day period for plugging or completion may be extended by the Board upon request from the well driller. Such request must be submitted prior to the end of the three (3) day period. In the alternative and prior to drilling equipment being removed from site, water well test holes may be temporarily cased with SDR 26 water well casing a minimum of 10 feet below ground and 12 inches above ground. Bentonite shall be installed from 10 feet to 2 feet below land surface and cement grout installed from 2 feet to land surface. The top of casing shall be properly sealed or capped. Permanent completion or plugging shall become the responsibility of the landowner and shall be completed within 60 days of drilling equipment being removed from the site. A written statement from the landowner acknowledging such responsibility shall be obtained and submitted to the Board with the multipurpose

completion report. The multi-purpose completion report shall be submitted to the Board within sixty (60) days after plugging or temporary completion of each water well test hole.

(c) **Permanent abandonment.** The following plugging requirements apply if a groundwater well, fresh water observation well, heat exchange well or water well test hole is permanently abandoned, was drilled by a person not holding a valid license or operator certification from the Board, or if the Board determines that the well or test hole was not drilled or completed in compliance with the applicable minimum standards set forth in this Chapter or may otherwise allow pollution to groundwater.

(1) The well driller shall be responsible for plugging the well or test hole if the well drilling equipment is on the drilling site. If a well is abandoned after the well drilling equipment has been removed from the drilling site, the owner of the land where the well or test hole is located shall be responsible for plugging.

(2) If the well or test hole is uncontaminated and unless paragraph 3 or paragraph 5 below applies, fill such well or water well test hole with uncontaminated, compacted drill cuttings and/or uncontaminated surface clay, cement, bentonite pellets or granules, or high solids (a minimum of twenty percent (20%) solids by dry weight) bentonite grout to within fourteen (14) feet of the land surface, and a minimum of ten (10) feet of the annular space and interior of the well casing shall be filled with cement grout to at least four (4) feet below the land surface.

(3) To plug uncontaminated groundwater wells, fresh water observation wells, or heat exchange wells in the alluvium and terrace deposits of the Arkansas, Cimarron, Salt Fork of the Arkansas, North Canadian, Canadian, Washita, North Fork of the Red, Salt Fork of the Red River, Red River, and other streams or rivers authorized by the Board, fill the well with clean, uncontaminated silica sand to within sixteen (16) feet of the land surface, then two (2) feet of bentonite pellets or granules shall be placed on the uncontaminated silica sand, and finally, a minimum of ten (10) feet of cement grout shall be installed in the annular space and interior of the well casing to at least four (4) feet below the land surface.

(4) Hand dug water wells shall be filled with uncontaminated surface clay or grout to within six (6) feet of land surface. The lining of the well shall be removed from the top five (5) feet and a minimum of two (2) feet of cement grout shall be installed. The top four (4) feet shall be filled with compacted uncontaminated native soil, unless otherwise directed by the Board.

(5) If the well or water well test hole is contaminated, or if the well or test hole is located at an underground tank site or within 300 feet of the outside perimeter of an existing wastewater lagoon or is located on a tract of land where a wastewater lagoon is proposed, the casing shall be removed or perforated from the bottom of the casing to twenty (20) feet below land surface. The casing shall be removed from twenty (20) feet below land surface to the surface, then the well or test hole shall be plugged with cement grout from the bottom to within four (4) feet below the land surface. If the total depth of the well is in excess of twenty feet (20') below land surface, the cement grout shall be placed by pumping from the bottom of the hole to the land surface.

**785:35-11-2. Plugging requirements for site assessment observation wells, monitoring wells and geotechnical borings**

(a) **Monitoring wells and site assessment observation wells.** Monitoring wells and site assessment observation wells shall be plugged to prevent pollution of groundwater within three (3) days after completion of use or immediately if drilled by an unlicensed or uncertified person or if the Board determines that the well does not meet the minimum construction standards set forth in this Chapter. The following are minimum requirements for plugging monitoring wells and site assessment observation wells, and the owner of such wells or other federal or state agency may specify more stringent requirements:

(1) If no contaminated soil or contaminated groundwater is present in the well, cement grout shall be placed in the well through a tremie pipe and filled or pumped from the bottom of the well to an elevation four (4) feet below the land surface. In the alternative, bentonite pellets, granules or high solids (a minimum of twenty percent (20%) solids by dry weight) bentonite grout shall be placed from the bottom of the well to an elevation fourteen (14) feet below land surface and a minimum of ten (10) feet shall be filled with cement grout to an elevation four (4) feet below land surface, unless contaminated soil or contaminated groundwater is present in the well. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil. If the depth of the well is fourteen (14) feet or less, cement grout shall be placed from the bottom of well to land surface.

(2) If contaminated soil or contaminated groundwater is present or was previously present in the well and the top of the screen is less than 20 feet below land surface, overdrilling of the well is required. The casing shall be removed or drilled out and the same size auger used to drill the borehole or larger shall be used to drill out the casing and associated seals, annular space and filter pack. Cement grout shall be placed from the bottom of the well to an elevation four (4) feet below land surface effectively grouting a minimum of 95% of the original drilled borehole depth. If the total depth of the well is in excess of twenty feet (20') below land surface, the cement grout shall be placed by pumping from the bottom of the hole to the land surface. If the top of the well screen is 20 feet or more below land surface and the well meets current minimum construction standards, then the casing need not be removed and cement grout shall be placed in the well through a tremie pipe and filled or pumped from the bottom upward to within four (4) feet of land surface or to land surface. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.

(b) **Geotechnical borings except direct push geotechnical borings.** Geotechnical borings shall be plugged to prevent pollution of groundwater within thirty (30) days after completion of drilling or immediately if drilled by an unlicensed or uncertified person or if the Board determines that the well does not meet the minimum construction standards set forth in this Chapter. The following are minimum requirements for plugging geotechnical borings, and the owner of the boring or other federal or state agency may specify more stringent requirements:

(1) If no contaminated soil and groundwater is encountered in the boring, uncontaminated drill cuttings, uncontaminated surface clay, cement, and/or high solids (a minimum of twenty percent (20%) solids by dry weight) bentonite grout,

pellets, or granules shall be placed from the bottom of the boring to an elevation fourteen (14) feet below land surface and a minimum of ten (10) feet shall be filled with cement grout to an elevation four (4) feet below land surface. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.

(2) If contaminated soil or contaminated groundwater is encountered in the boring, or if the boring is located at an underground storage tank site or within 300 feet of the outside perimeter of an existing wastewater lagoon or is located on a tract of land where a wastewater lagoon is proposed, cement grout shall be placed from the bottom of the borehole to an elevation four (4) feet below land surface. Cement grout shall be placed in the borehole through a tremie pipe and filled or pumped from the bottom upward. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.

(3) If the boring is twenty (20) feet or less in total depth and groundwater has not been encountered, the boring shall, at a minimum, be filled with compacted uncontaminated cuttings from the bottom of the boring to land surface.

(c) **Direct push geotechnical borings.** Direct push geotechnical borings shall be plugged to prevent pollution of groundwater within thirty (30) days after completion of drilling or immediately if drilled by an unlicensed or uncertified person or if the Board determines that the well does not meet the minimum construction standards set forth in this Chapter as follows:

(1) Bentonite chips shall be placed and effectively compressed within the annulus space from the bottom of the borehole to within ten (10) feet of the land surface.

(2) Cement grout shall be installed through a tremie pipe in the remaining annulus space from ten (10) feet to land surface, provided that no cement grout shall be required if the boring is less than ten feet (10') in total depth and no groundwater and no contaminated soil was encountered.

(d) **Cement grout requirements.** If cement grout is used, the grout shall have a mix ratio of one 94 pound sack of cement to a maximum of six U.S. gallons of water.

(e) **Abandonment after equipment removed.** If a site assessment observation well, monitoring well or geotechnical boring is abandoned after the drilling equipment has been removed from the site, responsibility for proper plugging within the applicable time period specified in this section shall lie with the owner of the land where the well or boring is located.