

Rule 5 Well Construction, Completion, and Technical Standards

Rule 5.1 Preamble

The following well construction and completion standards are required in order to provide for the health and safety of individuals and communities utilizing groundwater within the District, to prevent the unintentional contamination of potable groundwater resources, and to ensure the long-term quality of potable water supplies within the boundaries of the District.

A copy of the drilling permit (authorization to construct) must be on-site while the well is being constructed, a pump is being installed, or the well or pump is being re-worked or modified. The owner or agent, water well driller, and pump installer are equally responsible for compliance with this requirement.

Adopted May 17, 2005 by Board Order; effective May 17, 2005. Amended August 20, 2007 by Board Order 2007-029; effective August 23, 2007. Amended December 10, 2012 by Board Order 2012-008, effective December 12, 2012.

Rule 5.2 Applicability

Construction of all wells and installation of all pumps located within the District shall be in accordance with the Texas Occupations Code Chapter 1901, "Water Well Drillers" and Chapter 1902, "Water Well Pump Installers," as amended, and the Administrative Rules of the Texas Department of Licensing and Regulation, 16 Texas Administrative Code ("TAC"), Chapter 76, as amended. In addition, all wells and pumps must comply with the additional requirements of Rule 5.4, unless exempted from the Rule 5.4 requirements.

Adopted May 17, 2005 by Board Order; effective May 17, 2005.

Rule 5.3 Exemptions

5.3.A. The following wells are exempt from the Rule 5.4 requirements: environmental sampling wells, environmental monitoring wells, geotechnical wells, and geologic exploration wells.

5.3.B. Geothermal wells are exempt from the Rule 5.4 and 6.4 requirements, but shall comply with Rule 5.2 and 5.12.

Adopted May 17, 2005 by Board Order; effective May 17, 2005. Amended May 20, 2008 by Board Order 2008-007; effective May 23, 2008. Amended August 9, 2010 by Board Order 2010016; effective August 12, 2010.

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Rule 5.4 Additional Well Construction and Completion Standards

- 5.4.A.** All wells and pumps shall comply with these additional standards unless exempted under Rule 5.3.
- 5.4.B.** The borehole shall be a minimum of three inches (3") larger in diameter than the outside diameter of the casing to be used. The casing shall extend from the surface to twenty feet (20') into the hydrologic unit that is to be utilized as a water source.
- 5.4.C.** All water wells shall be cemented from twenty feet (20') into the hydrologic unit to the ground surface.
- 5.4.D.** When pressure sealing the annular space, the end of the tremie pipe shall be set within twenty (20) feet of the bottom of the packer or cementing point. Concrete slurry shall be placed in successive lifts of appropriate depths so as not to collapse the casing. Each lift shall be allowed to cure prior to beginning the next lift. An adequate number of lifts shall be placed until the slurry reaches the ground surface.
- 5.4.E.** When sealing the annular space with bentonite, bentonite slurry may be utilized. At a minimum, a cement plug of twenty feet shall be set on the bottom of the casing on top of the packer or gravel pack. Sealing of the annular space will begin within 20 feet of the bottom of the casing. Bentonite slurry will be placed in successive lifts to ensure proper hydration. Successive lifts will be placed until the top of the bentonite seal reaches no less than 8 feet from the ground surface. The annular space from the top of the bentonite seal to the ground surface will be filled with concrete slurry.
- 5.4.F.** The casing shall extend at least twenty-four inches (24") above land surface at a site not within the 100-year floodplain, as determined from Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA).
- 5.4.G.** If a well is placed within the 100-year floodplain, it shall be completed with a water tight sanitary well seal and steel casing extending a minimum of thirty six inches (36") above the 100-year floodplain level. The well owner shall provide a certificate, signed and sealed by a Registered Professional Land Surveyor, or Professional Engineer, which indicates the floodplain elevation as indicated on the FEMA map, along with the elevation of the top of the casing.

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5.4.H. All wells completed with PVC casing shall be completed according to one of the three surface completion methods as described by the following:

- (1) **Slab** - The slab or block shall extend at least two feet (2') from the well in all directions and have a minimum thickness of four inches (4"), and shall be separated from the well casing by a plastic or mastic coating or sleeve to prevent bonding of the slab to the casing. The surface of the slab shall be sloped to drain away from the well. The top of the casing shall extend a minimum of twenty inches (20") above the top of the slab.
- (2) **Steel and PVC Sleeve** - The steel sleeve shall be a minimum of 3/16" in thickness and/or the plastic sleeve shall be a minimum of Schedule 80 sun resistant and twenty-four inches (24") in length and shall extend twelve inches (12") into the cement, except when steel casing or a pitless adapter is used. The casing shall extend a minimum of one foot (1') above the original ground surface, and the steel sleeve shall be two inches (2"), larger in diameter than the plastic casing being used.
- (3) **Pitless Adapters** - In wells with Steel or Plastic Casings completed with pitless adapters, the adapters shall be welded to the casing or fitted with another suitably effective seal, and the borehole-casing annulus filled with cement slurry or bentonite down to the top of the water bearing formation to be utilized as a water source. All wells completed with pitless adapters shall satisfy all State water well completion and annular space sealing requirements that pertain to pitless adapters.

5.4.I. All wells shall be equipped with a water tight sanitary well seal with an inspection port, or some other means which allows for free access to the water table for the purpose of water level measurement and disinfection. Any well presently not equipped with a water-tight sanitary well seal is required to be so equipped in the future when that well is serviced. On those wells with odd sized casing, which cannot be fitted with a factory made water tight sanitary well seal, the completion shall be done in a manner that shall prevent any pollutants from entering the well.

5.4.J. All wells must have a marker permanently installed in the concrete slab to identify the well's registration or permit number. The marker will be provided by the District at the time of registration.

5.4.K. A geophysical log shall be prepared on all wells drilled after May 23, 2008 that require an operating permit under Rule 3.5. The log shall provide

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qualitative information on aquifer characteristics and groundwater quality. At a minimum, the geophysical logs shall include an electrical log with shallow and deep-investigative curves (e.g., 16-inch short normal/64-inch long normal resistivity curves or induction log) with a spontaneous potential curve, and a caliper. The General Manager, upon written request, may waive this requirement if the operating permit requests less than 131,400 gallons per year.

- 5.4.L.** This Rule 5.4.L applies to all water wells located within the Comfort, Waring, Turkey Knob, Ranger Creek, and Jack Mountain USGS quadrangles not mandatorily exempt from permitting under Texas Water Code Section 36.117(b)(1) that are proposed to be drilled at a site with a ground surface elevation at or above 1700 feet msl (mean sea level), as determined from the USGS 7 ½ minute quadrangle topographic map, other acceptable published data, or an elevation certificate. Casing for such wells shall be set to a minimum elevation of 1680 feet msl, (i.e.- A well drilled at a ground surface elevation of 1900 feet msl would have to set at least 220 feet of casing).

Adopted May 17, 2005 by Board Order; effective May 17, 2005. Amended September 12, 2005 by Board Order 2005-007; effective September 14, 2005. Amended August 20, 2007 by Board Order 2007-029; effective August 23, 2007. Amended May 20, 2008 by Board Order 2008-007; effective May 23, 2008. Amended August 9, 2010 by Board Order 2010-016; effective August 12, 2010.

Rule 5.5 *Authorized Well Drillers and Well Pump Installers*

- 5.5.A.** Only persons who have a license issued by the Executive Director of the Texas Department of Licensing and Regulation pursuant to Texas Occupations Code Chapter 1091 and whose licenses are verified with the District are allowed to commercially drill wells within the District. Licenses must be verified with the District on forms provided by the District and be in accordance with and contain information called for in the form of verification.
- 5.5.B.** Commercial Pump Installers are required to verify that they have a license issued by the Executive Director of the Texas Department of Licensing and Regulation pursuant to Texas Occupations Code Chapter 1902. License verification shall be on forms provided by the District and shall be in accordance with and contain the information called for in the form of verification.
- 5.5.C.** The only exceptions from the requirements of Rules 5.5.A and 5.5.B are the exceptions provided by 16 Texas Administrative Code Chapter 76, which includes an exception for owners drilling wells on their own property.

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5.5.D. When a water well driller or pump installer is performing activities within the District, they are subject to the authority of the District and these Rules. When such activities are undertaken on behalf of a well owner, the driller or installer is acting as the well owner's agent and is subject to enforcement for non-compliance to the same extent as the well owner.

Adopted May 17, 2005 by Board Order; effective May 17, 2005. Amended August 20, 2007 by Board Order 2007-029; effective August 23, 2007.

Rule 5.6 *Reporting and Recordkeeping*

5.6.A. Well Drilling and Completion Reports

The State of Texas Well Report, any pump test data, water level data, water quality data, or any other data pertinent to a well shall be submitted to the District office within 60 days after completion of the well or after the data is compiled or prepared, whichever is earlier. This shall include information about the production capability of the well and the type of and location of use of the groundwater. Although the information will ordinarily be submitted by the well driller or pump installer, the owner is equally responsible for ensuring compliance with this Rule.

5.6.B. Pump Report

When there is a change in the size or depth of a well pump, or a replacement pump is installed, the serial number and size of the pump shall be submitted to the District office within 60 days after the work is completed. Although the information will ordinarily be submitted by the well driller or pump installer, owner is equally responsible for ensuring compliance with this Rule.

5.6.C. Water Use Report / Meter Readings

The production from all wells required under Rule 3.5 to obtain an operating permit shall be recorded using a meter. The owner shall keep a record of monthly water production. The water production records shall be submitted to the District on a monthly basis, by the 10th of each month for the preceding month, unless the District imposes alternate recordkeeping and reporting requirements in the operating permit for the well.

Adopted May 17, 2005 by Board Order; effective May 17, 2005. Amended August 20, 2007 by Board Order 2007-029; effective August 23, 2007. Amended August 9, 2010 by Board Order 2010-016; effective August 12, 2010.

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Rule 5.7 *Sealing of Wells*

Following public notice, the Board may order the sealing of a well that is in violation of District Rules or that has been prohibited from producing groundwater. The reasons for ordering the sealing of a well include, but are not limited to: (1) failure to apply for an operating permit prior to drilling a well that under Rule 3.5, requires an operating permit; (2) operating such a well without an operating permit; or (3) when the Board has denied, cancelled, or revoked an operating permit.

Once the Board has ordered a well sealed, the District, following the procedures of Rule 5.10, shall seal the well by physical means, tag it to indicate that the well has been sealed by the District, or take any other appropriate action necessary to clearly indicate that the well has been sealed. The seal is intended to preclude operation of the well and/or identify unauthorized operation of the well.

Tampering with, altering, damaging, removing, or violating the seal of a sealed well in any way, or pumping groundwater from a well that has been sealed constitutes a violation of District Rules and subjects the person who performs that action, as well as the well owner, to enforcement and penalties pursuant to all applicable District Rules.

Adopted May 17, 2005 by Board Order; effective May 17, 2005.

Rule 5.8 *Capping of Wells*

The District shall require an open or uncovered well that is in a non-deteriorated condition to be capped to prevent waste, pollution, or prevent deterioration. The well shall remain capped until conditions that led to the capping are eliminated. The cap shall provide a sanitary seal to prevent the introduction of potential contaminants and shall be capable of sustaining a weight of at least four hundred (400) pounds. If the owner fails to close or cap the well in compliance with District Rules, the District, following the procedures of Rule 5.10, shall cap the well. Reasonable expenses incurred by the District in capping a well constitute a lien on the land on which the well is located pursuant to Texas Water Code Section 36.118.

Adopted May 17, 2005 by Board Order; effective May 17, 2005.

Rule 5.9 *Plugging of Wells*

5.9.A. Not later than the 180th day after the date a landowner or other person who possesses a deteriorated or abandoned well learns of its condition, the well shall be plugged in accordance with Texas Department of Licensing and

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Regulation, 16 Texas Administrative Code, Chapter 76, as amended, as modified by this Rule 5.9.

- 5.9.B.** Prior to plugging a well, casing, liner, or bore hole, a plugging plan shall be submitted to the District. Written authorization shall be obtained from the District prior to initiating the plugging operation.
- 5.9.C.** The District shall be notified at least 24 hours prior to the plugging operation. If written authorization has been granted by the District, this notification can be done by telephone.
- 5.9.D.** All removable casing shall be removed from the borehole. Non-removable casing shall be cut off at the ground level. The well must be free of any obstructions to the bottom of the borehole. If the borehole has obstructions all debris must be removed prior to the commencement of the plugging operation.
- 5.9.E.** The total depth of the well shall be determined by tagging or logging the borehole. When more than one hydrologic unit is present, the well shall be plugged by filling the borehole to within 20 feet of the top of the hydrologic unit that was utilized as a water source with:
- (1) washed and disinfected pea gravel free of flocculants or other chemicals; or
 - (2) 3/8 inch bentonite.
- 5.9.F.** Wells completed with screen or perforated casing that could not be removed shall be pressure-cemented via tremie pipe from total depth to surface. Bentonite grout may also be use, but shall have at least 2 feet of cement at the top to serve as an atmospheric seal.
- 5.9.G.** If only one hydrologic unit is present, the borehole shall be filled with washed and disinfected pea gravel or 3/8 inch bentonite to the water level or to the casing point if the casing point has a lower elevation than the water.
- 5.9.H.** The remainder of the borehole shall be pressure-cemented via tremie pipe from the top of the washed and disinfected pea gravel free of flocculants or other chemicals or 3/8 inch bentonite to the land surface.
- 5.9.I.** Bentonite grout may also be used up to two (2) ft from the surface and cemented so that the remaining borehole creates an atmospheric seal. For aesthetic or ground working reasons the two (2) ft cement atmospheric seal can be placed up to six (6) ft below ground level and the remaining borehole may be topped off with topsoil.
- 5.9.J.** If the well to be plugged has one hundred (100) feet or less of standing water the entire well may be filled with a solid column of 3/8 inch granular sodium

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bentonite hydrated at frequent intervals while strictly adhering to the manufacturers' recommended rate and method of application. The top two (2) feet above any bentonite granular sodium bentonite shall be filled with cement as an atmospheric barrier. Bentonite may not be used if a water zone contains chlorides above 1500 ppm or if hydrocarbons are present.

- 5.9.K.** It is the responsibility of the landowner to ensure that such a well is plugged in order to prevent pollution of the groundwater and to prevent injury to persons.
- 5.9.L.** Not later than the 30th day after the date the well is plugged, a State of Texas Plugging Report and any driller's or geologist's logs (field notes on stratigraphy), shall be submitted to the District.
- 5.9.M.** Environmental sampling wells, environmental monitoring wells, geotechnical wells, and geologic exploration wells shall comply with Rule 5.9.A and Texas Department of Licensing and Regulation, 16 Texas Administrative Code § 76.1004, except that submittal of a plugging plan prior to plugging is not required.
- 5.9.N.** If the owner fails to plug the well in compliance with District Rules, the District, following the procedures of Rule 5.10, shall plug the well. Reasonable expenses incurred by the District in plugging a well constitute a lien on the land on which the well is located pursuant to Texas Water Code section 36.118.

Adopted May 17, 2005 by Board Order; effective May 17, 2005. Amended May 20, 2008 by Board Order 2008-007; effective May 23, 2008. Amended December 10, 2012 by Board Order 2012-008; effective December 12, 2012.

Rule 5.10 Right to Inspect and Enter Property

The District has authority under Texas Water Code Section 36.123 to enter any public or private property located within the District at any reasonable time for purposes of inspecting and investigating conditions relating to water quality, wells, or compliance with District Rules, regulations, permits, or orders. The District respects individual property rights and shall endeavor to minimize any inconvenience to property owners while conducting District business. Whenever possible, the District shall notify, coordinate, and schedule well and property access in advance with the property owner, his agent, tenant, or other local contact. Notice is not required if prior permission to enter land or access wells has been granted by the property owner, his agent, tenant, or other local contact. District employees or agents accessing public or private wells or property shall exhibit proper credentials upon request. District employees or agents acting under this

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authority shall observe all applicable rules and regulations concerning safety, internal security, and fire protection. If unexpected, emergency, or critical conditions require the District to access public or private wells or property without prior access arrangements, the District shall, at the first reasonable opportunity, contact the property owner, his agent, tenant, or other local contact. The District shall inform him that the District accessed the well or property, the reasons for the District access, and any pertinent information or action resulting from the District's access.

Adopted May 17, 2005 by Board Order; effective May 17, 2005.

Rule 5.11 Meter Registration

5.11.A. A meter must be installed and must be registered with the District before the District will issue an operating permit for a well.

5.11.B. All meters installed to comply with District Rules or permits must be registered within 30 days of installation. The registration form is available in the District office.

Adopted August 20, 2007 by Board Order 2007-029; effective August 23, 2007 Amended December 10, 2012 by Board Order 2012-008; effective December 12, 2012.

Rule 5.12 Geothermal Wells

5.12.A. All geothermal wells shall comply with these minimum standards, as well as the requirements of Rule 5.2. Each system shall register with the District on a form available from the District office.

5.12.B. Pressure cemented/bentonite to a minimum of 20 feet below the land surface, except in the case where the borehole encounters more than one hydrologic unit as defined in these Rules. Boreholes that encounter more than one hydrologic unit shall be cemented from twenty feet into the hydrologic unit being utilized to the ground surface. No commingling of hydrologic units is allowed.

5.12.C. All fill used in the borehole (i.e. gravel or crushed limestone) shall be washed and disinfected prior to use.

5.12.D. Open loop geothermal wells are prohibited in the District.

5.12.E. Within 60 days after completion, a State of Texas Well Report for at least one of the boreholes drilled shall be submitted to the District to ensure compliance with Rule 5.12.B.

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Adopted May 20, 2008 by Board Order No. 2008-007; effective May 23, 2008. Amended August 9, 2010 by Board Order 2010-016; effective August 12, 2010.

Rule 5.13 Pump Test

When a pump test is required by the District, it must conform to the minimum standards set out in this Rule 5.13.

5.13.A. The well shall be pumped with a pump capable of varying its discharge rate. During the testing period, the discharge rate shall be adjusted until the water level in the well stabilizes and remains constant for a pumping period of thirty-six (36) hours.

5.13.B. After the well is pumped, water levels shall be taken every hour for thirty-six (36) hours after the test to determine the recovery rate of the well. If the water level recovers to within one (1) foot of the pre-test level before the thirty six (36) hour period following the test, the test can be concluded.

5.13.C. The well shall be equipped with a meter properly sized for the flow rate of the well. Meter readings and water levels shall be taken prior to and at the conclusion of each test, and at least every hour during the test (pumping and recovery).

Adopted August 9, 2010 by Board Order 2010-016; effective August 12, 2010.