

**TITLE 16 ECONOMIC REGULATION
PART 1 RAILROAD COMMISSION OF TEXAS
CHAPTER 6 GEOTHERMAL RESOURCES**

**SUBCHAPTER A SHALLOW CLOSED-LOOP
GEOTHERMAL SYSTEMS**

§6.101 Purpose and Scope

This subchapter implements the state program for the regulation of shallow closed-loop geothermal systems under the jurisdiction of the Commission consistent with state and federal law for the protection of fresh water, including regulation of the drilling of the borehole, completion of the well, and the construction, operation, and plugging of shallow closed-loop geothermal systems.

Source Note: The provisions of this §6.101 adopted to be effective January 6, 2025, 50 TexReg 103

§6.102 Definitions

The following terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

(1) Annular space--The space between the borehole wall and the heat exchange loop installed within the borehole.

(2) Aquifer--A geologic formation that contains enough saturated permeable material to provide significant quantities of water to wells and springs.

(3) Casing--A metal or plastic pipe installed into the borehole to prevent the sides from collapsing and to protect groundwater from contamination.

(4) Commission--The Railroad Commission of Texas.

(5) Director--The director of the Oil and Gas Division or the director's delegate.

(6) Fresh water--Groundwater containing 1000 parts per million (ppm) or less total dissolved solids.

(7) Groundwater conservation district--Any district or authority created under Section 52, Article III, or Section 59, Article XVI, Texas Constitution that has the authority to regulate the spacing of water wells, the production from water wells, or both as defined in Texas Water Code §36.001.

(8) Grouting--The material used to achieve an impervious seal in the borehole after the heat exchange loop has been installed.

(9) Heat exchange loop--A conduit used in shallow closed-loop geothermal heat systems factory manufactured by fusing a U-bend fitting to dual coil polyethylene pipe, with fusion equipment for heat transfer.

(10) Individual permit--A permit, other than an authorization by rule or general permit, for a specific activity at a specific location.

(11) Injection well--A well into which fluids are injected.

(12) License number--The number assigned to a water well driller or pump installer by the Texas Department of Licensing and Regulation (TDLR).

(13) Licensed pump installer--A person licensed by TDLR to install submersible pumps.

(14) Open-loop air conditioning return flow wells--Class V Underground Injection Control (UIC) wells used to return groundwater, which has been circulated through open-loop, heat pump/air condition (HAC) systems, to the subsurface. These wells are regulated by the Texas Commission on Environmental Quality under 30 Texas Administrative Code §331.11 and §331.12.

(15) Owner--The owner of a shallow closed-loop geothermal system subject to the requirements of this subchapter.

(16) Person--A natural person, corporation, organization, government, governmental subdivision or agency, business trust, estate, trust, partnership, association, or any other legal entity.

(17) Pitless adapter--An adapter that provides a water-tight connection between the drop pipe from the submersible pump inside a well and the water line running to the service location. The device not only prevents water from freezing but also permits easy maintenance of the system components without the need to dig around the well.

(18) Pump installer--A person who installs or repairs well pumps and equipment. A person does not have to be a "licensed pump installer" to install, repair, or service above ground pumps for shallow closed-loop geothermal systems.

(19) Shallow closed-loop geothermal injection well--An injection well that is part of a shallow closed-loop geothermal system. These types of wells are limited to a depth of formations that contain water with a total dissolved solids content of 1000 parts per million (ppm) or less.

(20) Shallow closed-loop geothermal system--A closed-loop geothermal injection well, including all heat pumps and tubing, heat transfer fluids, and connections from the injection well to the infrastructure and the geothermal heat exchange system, that operates as a heat source or heat sink in concert with a heating, ventilation, and air conditioning system designed to heat or cool infrastructure. These systems are also called "ground source heat pump systems." All energy used

from this type of system is consumed by the onsite infrastructure and is not provided to an energy market.

(21) TDLR--The Texas Department of Licensing and Regulation.

(22) Total dissolved solids--The total dissolved (filterable) solids as determined by use of the method specified in 40 Code of Federal Regulations Part 136.

(23) Tracking number--The designated number assigned by TDLR for a specific well report.

(24) Water well driller--A person or company possessing a water well driller's license issued by TDLR.

(25) Well report--The State of Texas Well Report administered by TDLR.

Source Note: The provisions of this §6.102 adopted to be effective January 6, 2025, 50 TexReg 103

§6.103 Applicability and Compliance

(a) This subchapter applies to shallow closed-loop geothermal systems in this state for which construction is commenced on or after January 6, 2025.

(b) Any shallow closed-loop geothermal system in this state which was constructed before January 6, 2025, is exempt from the requirements of this subchapter unless altered, deteriorated, abandoned, or determined by the Director to:

(1) encounter groundwater that is detrimental to human health and the environment or cause pollution to land, surface water, or other groundwater;

(2) cause a violation of primary drinking water regulations under 40 CFR Part 142; or

(3) otherwise adversely affect human health or the environment.

(c) This subchapter does not apply to:

(1) open-loop air-conditioning return flow wells used to return water that has been used for heating or cooling in a heat pump to the aquifer that supplied the water;

(2) other geothermal injection wells; or

(3) pond/lake geothermal heat pump systems.

(d) Compliance with this subchapter does not relieve the driller or installer from compliance with the licensing requirements of TDLR regulations adopted under Texas Occupations Code, Chapters 1901 and 1902.

Source Note: The provisions of this §6.103 adopted to be effective January 6, 2025, 50 TexReg 103

§6.104 Authorization by Rule

(a) An authorization by rule (or "permit by rule") provides authority to operate under predetermined requirements without a separate application process, so

long as the Director confirms the activity meets the specified predetermined requirements.

(b) An owner in compliance with this subchapter is authorized by rule to cause to be drilled and installed and to operate a shallow closed-loop geothermal system and is not required to obtain an individual permit except as provided by subsection (b) of this section. The owner shall register the system as authorized by rule in accordance with §6.105 of this title (relating to Registration of a Shallow Closed-Loop Geothermal System for Authorization by Rule).

(c) The Director will review the registration required by §6.105 of this title (relating to Registration of a Shallow Closed-Loop Geothermal System for Authorization by Rule) and the well report required by §6.110 of this title (relating to Well Reports).

(1) The Director will review the registration and the well report to determine whether the shallow closed-loop geothermal injection well:

(A) encounters groundwater that is detrimental to human health and the environment or can cause pollution to land, surface water, or other groundwater;

(B) may cause a violation of primary drinking water regulations under 40 CFR Part 142;

(C) deviates from any construction or operational standards of §6.106 and §6.109; or

(D) may otherwise adversely affect human health or the environment.

(2) If upon review of the registration or the well report, or at any other time, the Director determines that a condition listed in paragraph (1) of this subsection exists, the Director may take any of the following actions:

(A) require the owner to obtain an individual permit;

(B) require the owner to take such actions (including, where required, closure of the injection well) as may be necessary to prevent the violation; or

(C) refer the violation for enforcement action.

(d) If the Director makes a determination under subsection (b) of this section, the owner shall cease injection operations until the owner complies with the Director's requirements. The owner may request a hearing to contest the Director's determination.

Source Note: The provisions of this §6.104 adopted to be effective January 6, 2025, 50 TexReg 103

§6.105 Registration of a Shallow Closed-Loop Geothermal System for Authorization by Rule

(a) Registration for authorization by rule.

(1) Prior to commencing operations for a shallow closed-loop geothermal system, the owner of the system

shall submit to the Director a registration for authorization by rule. The registration shall be signed by the owner, include the TDLR license numbers required by paragraphs (2) and (3) of this subsection, and include the following statement: "I declare under penalties prescribed in Section 91.143, Texas Natural Resources Code, that I will use the services of a licensed water well driller as required under 16 Texas Administrative Code §6.105(a)(2) and I agree to plug the well upon abandonment."

(2) All shallow closed-loop geothermal injection wells shall be drilled and completed by a water well driller who holds a current and valid water well driller's license issued by TDLR. Prior to commencing operations for a shallow closed-loop geothermal injection well, an owner shall provide to the Director the name and TDLR license number of the TDLR water well driller.

(3) If the shallow closed-loop geothermal system utilizes a submersible pump, the submersible pump associated with the shallow closed-loop geothermal system shall be installed by a pump installer who holds a current and valid pump installer's license issued by TDLR. Prior to commencing installation of the pumps and other equipment, an owner shall provide to the Director the name and TDLR license number of the pump installer.

(b) Inventory. Drillers of shallow closed-loop geothermal injection wells authorized by rule shall inventory wells after construction by completing the TDLR state well report form and submitting the form to the Director within 30 days from the date the well construction is completed. Any additives, constituents, or fluids (other than potable water) that are used in the closed loop system shall be reported on the state well report form.

(c) Approval. A registration submitted under this section will be reviewed by the Commission's Special Injection Permits (SIP) Unit. The SIP Unit will notify the owner when the TDLR state well report form is approved by the Commission. The owner may operate the system as soon as the owner receives the SIP Unit's approval.

Source Note: The provisions of this §6.105 adopted to be effective January 6, 2025, 50 TexReg 103

§6.106 Construction Standards

(a) Siting and setback. All wells shall be located at least 10 feet from adjacent property lines and sewer lines, and at least 25 feet from potential sources of contamination that include but are not limited to septic

tanks/fields, livestock pens, or material storage facilities.

(b) Surface completion. Water well drillers drilling a shallow closed-loop geothermal injection well shall place a concrete slab or sealing block above the cement slurry around the well.

(1) The slab or block shall extend at least two feet from the well in all directions and have a thickness of at least four inches. The slab or block shall be separated from the well casing by a plastic or mastic coating or sleeve to prevent bonding of the slab to the casing.

(2) The surface of the slab shall be sloped so that liquid drains away from the well.

(3) A pitless adapter may be used if:

(A) the adapter is welded to the casing or fitted with another equally effective seal; and

(B) the annular space between the borehole and the casing is filled with cement to a depth not less than 20 feet below the adapter connection.

(c) Commingling prohibited. All shallow closed-loop geothermal injection wells shall be completed so that aquifers or zones containing waters that are known to differ significantly in chemical quality are not allowed to commingle and cause degradation of any aquifer containing fresh water.

(d) Drilling and completion requirements.

(1) Casing. Temporary casing may be installed to prevent overburden cave-in prior to the installation of tubing material and grouting of shallow closed-loop geothermal injection wells. If temporary casing is not installed, the completion of well construction should proceed as soon as possible upon completion of the borehole. If temporary casing is installed, it shall comply with the following requirements:

(A) Steel well casing wall thickness shall be dependent on casing length and shall be determined using American Petroleum Institute (API) or American Water Works Association (AWWA) standards but in no circumstance shall have less than a .233-inch wall thickness.

(B) Plastic well casing or screen shall not be driven. Plastic well casing shall meet the requirements specified in the ASTM Standard F480, Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR) as amended and supplemented. Plastic casing shall also meet the American National Standards Institute (ANSI) standards for "Plastic Piping System Components and Related Materials."

(C) If the use of a steel or polyvinyl chloride (PVC) sleeve is necessary to prevent possible damage to the casing, the steel sleeve shall be a minimum of 3/16

inches in thickness and the PVC sleeve shall be a minimum of ASTM D1785 Schedule 80 sun-resistant and 24 inches in length. Any sleeve shall extend 12 inches into the cement slurry.

(D) Shallow closed-loop geothermal injection wells are not required to be cased into bedrock.

(2) The water well driller shall backfill the annular space of a shallow closed-loop geothermal injection well from the surface to the total depth with grouting material in a manner that meets or exceeds good engineering practices and the best current available technology. Grouting materials consist of a combination of bentonite, cement, thermally enhanced material, or a combination of such materials. In instances where boreholes will not support a grouting slurry, grouting alternatives, such as solid bentonite chip material may be used. Any other material used to backfill the annular space of a shallow-closed loop geothermal injection well must be approved by the Director.

(3) Where no groundwater or only one zone of groundwater is encountered during drilling, grouting alternatives may be used to backfill up to 30 feet from the surface. The water well driller shall fill the top 30 feet with grouting or grouting alternatives that have been approved by the Director.

(4) At all times during the progress of work, the driller shall provide protection to prevent tampering with the well or introduction of foreign materials into the well.

(5) Borehole diameter shall, at a minimum, allow for the insertion of a pipe sized to ensure all concrete is properly located, distributed, and cured based on the overall design and operation of the shallow closed-loop geothermal injection well. Loop tubing shall be installed for the purpose of filling the annulus between the tubing and the borehole with sand and grout material.

(6) No section of the annulus between the heat exchange loop and borehole wall shall remain open after completion of the well.

(7) For heat exchange loop material and connection requirements, the applicable American Society for Testing and Materials (ASTM) standards for the polyethylene (PE) pipe material shall be used. The heat exchange loop shall not be forced into the borehole or past an obstruction in such a manner that the structural integrity of the tubing may be compromised. This includes but is not limited to instances of cave-in, bedrock dislodgement, partial blockage, or overburden.

(8) All heat exchange loop pipe connections to be placed in the borehole shall be connected by heat-fusion, electrofusion, or a similar joints process. In addition to heat fusion or electrofusion joints, non-

metallic mechanical stab-type insert fittings shall meet applicable ASTM standards.

(9) Wells that use a plastic loop require the placement of a high solids bentonite slurry grout with at least 20 percent solids by weight for any depth interval of the boring that is in a confining or semi-confining layer containing significant silt and/or clay.

(10) If copper tubing is used for heat exchange applications, all below grade copper connections shall be joined by brazing using a filler material with a high melting temperature such as a material with 15% silver content or equivalent.

(e) Heat Transfer Fluids.

(1) Potable water, food grade propylene glycol, and USP-grade propylene glycol are the only antifreeze additives a water well driller may use for shallow closed-loop geothermal injection wells.

(2) Any deviation from the approved antifreeze additives requires an individual permit.

Source Note: The provisions of this §6.106 adopted to be effective January 6, 2025, 50 TexReg 103

§6.108 Pump Installer Requirements

The pump installer shall:

(1) verify all owner information prior to installing any components of a shallow closed-loop geothermal system;

(2) verify that all the pumps, tubing, and connections from the well to the infrastructure and the geothermal heat exchange system are installed, tested, and backfilled in a manner that is consistent with this subchapter and any other applicable local, state, or federal guidelines, regulations, and ordinances;

(3) install all subsurface infrastructure such as loops or tubing; and

(4) comply with all other applicable state regulations, statutes, and local ordinances.

Source Note: The provisions of this §6.108 adopted to be effective January 6, 2025, 50 TexReg 103

§6.109 Operational Standards

(a) Safety. The system must clearly be marked identifying it as a shallow closed-loop geothermal system.

(b) Pressure testing. Shallow closed-loop geothermal injection wells shall be pressure-tested with water at 100 psi (690 kPa) for 30 minutes prior to backfilling of connection (header) trenches. Any leaking loop shall be repaired or replaced prior to completing the well.

(c) Local regulation. The Commission does not require the submittal of site plans for wells authorized by rule under this subchapter. However, a site plan may

be required by a local health agent, other local governmental entity, and/or a groundwater conservation district.

Source Note: The provisions of this §6.109 adopted to be effective January 6, 2025, 50 TexReg 103

§6.110 Well Reports

(a) The water well driller is required by §76.70 of this title (relating to Responsibilities of the Licensee -- State Well Reports) to submit a well report to TDLR electronically through the Texas Well Report Submission and Retrieval System (TWRSRS). The driller shall provide an electronic copy of the well report to the Director within 30 days of well completion. A well report is not required for each well constructed on one site; however a map or drawing of each well shall be provided.

(b) At a minimum, a completed copy of the well report must include the following information for each well or wells drilled:

(1) the name and address of the owner of the well or wells;

(2) the county in which the well or wells were drilled;

(3) a list of any other wells drilled at the same time;

(4) the owner well number (if assigned);

(5) the Latitude/Longitude (WGS 84 datum in either Degrees/Minutes Seconds or Decimal Degrees) of the well or wells;

(6) the elevation (surface level of drill site expressed in feet above sea level);

(7) the drilling start date and end date (expressed in month/date/year);

(8) a schematic showing the borehole or boreholes' diameter in inches, the bottom depth in feet, and the drilling method;

(9) the driller's name;

(10) the water well driller's TDLR license number; and

(11) any additives, constituents, or fluids to make up the heat transfer fluid.

(c) Incomplete well reports may be subject to a notice of violation from the Commission. Failure to complete a well report within 30 days of a notice of violation may result in enforcement action.

(d) A shallow closed-loop geothermal system, once drilled, installed, and operating is a permanent fixture of the property. If the property is transferred, both the transferor owner and the transferee owner shall notify the Commission of the transfer within 30 days of the date of the transfer. The transferee owner shall be responsible for plugging the well upon abandonment.

(e) Texas Occupations Code §1901.251 authorizes the owner or the person for whom the well was drilled to request that information in well reports be made confidential. If such person seeks to request confidentiality, the person shall file a written request with the Commission via certified mail. If the Commission receives a request under the Texas Public Information Act (PIA), Texas Government Code, Chapter 552, for materials that have been designated confidential, the Commission will notify the filer of the request in accordance with the provisions of the PIA so that the filer can take action with the Office of the Attorney General to oppose release of the materials.

Source Note: The provisions of this §6.110 adopted to be effective January 6, 2025, 50 TexReg 103

§6.111 Plugging

(a) Upon permanent discontinued use or abandonment of a shallow closed-loop geothermal injection well, the owner shall plug the well according to the following standards:

(1) All removable casing shall be removed and the entire well shall be pressure filled with cement from bottom to the land surface using a pipe correctly sized to ensure all cement is properly located, distributed, and cured; and

(2) The well may be filled with fine sand, clay, or heavy mud followed by a cement plug extending from land surface to a depth of not less than ten feet below the land surface.

(b) Any fluids injected into the closed loop system shall not endanger fresh water.

(c) Not later than the 30th day after the date the well is plugged, a driller or well owner who plugs an abandoned well shall submit to the Commission a completed copy of the well plugging report filed with the TDLR electronically through the Texas Well Report Submission and Retrieval System (TWRSRS).

Source Note: The provisions of this §6.111 adopted to be effective January 6, 2025, 50 TexReg 103

§6.112 Enforcement and Penalties

(a) A well which violates any requirement of this subchapter or a condition of a permit issued under §6.104(b) of this title (relating to Authorization by Rule) is subject to appropriate enforcement action. The Director may require owners or drillers to submit additional information deemed necessary to protect fresh water. If the required information is not submitted, the owner may be prohibited from using the well until the information is received by the Director.

(b) If a person violates any requirement of this subchapter or a condition of a permit issued under §6.104(b) of this title, the person may be assessed a civil penalty by the Commission. The penalty may not exceed \$10,000 a day for each violation. Each day a violation continues may be considered a separate violation. In determining the amount of the penalty, the Commission will consider the person's history of previous violations, the seriousness of the violation, any hazard to the health or safety of the public, and the demonstrated good faith of the person.

Source Note: The provisions of this §6.112 adopted to be effective January 6, 2025, 50 TexReg 103