




# TEXAS GROUNDWATER ASSOCIATION

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RE: 16 TAC §§6.101 – 6.112 – Proposed Subchapter A of Chapter 6 Texas Administrative Code

Texas Groundwater Association would like to thank you for the opportunity to comment on the proposed rules for regulating Shallow Closed-Loop Geothermal Injection Wells. As an organization that represents licensed water well drillers and pump installers in the state, it is imperative to be able to advocate for rules and regulations that would bear an impact on the industry. Through this process, we have engaged with other professionals, experts, and leaders in ground source heat pump design and installation.

As a group, we respect the legislature's decision to transfer the authority of closed-loop geothermal injection wells from TCEQ to the Railroad Commission. We are very appreciative of the open dialogue that has been afforded in an attempt to make this rule-making process as simple and effective as possible. We believe that the Commission and Texas have an opportunity to set a standard for other states in regulating an industry, while not new, is still emerging.

We want to offer the following recommendations for the Commission's consideration. However, we also would like to suggest that the Commission, similar to other regulated industries, deliver a best practices guideline or document and suggest that ANSI/CSA/IGSHPA C448 serve as reference.

While we understand that SB 786 has defined "shallow closed-loop geothermal injection well" which limits the Commission's ability to make changes in that regard, we feel it is important to note that the intended regulated borehole is utilized as a thermal energy exchange and at no time is water, other fluids, or gases injected or extracted from any below surface formations.

We recommend that communication continues with the state legislature to improve the definitions by using industry nomenclature (ground source heat pump borehole) and eliminating misconceptions and confusion with injection wells intended for geothermal power generation.

Also, due to no exchange of commodities and these boreholes not being under the jurisdiction of the Oil & Gas Division nor performing operations within the jurisdiction of the Commission's Safety Division in accordance with Pipeline Safety Statewide Rule 58, it is our recommendation that the operation of these systems be exempt from completing Organization Report Form P-5.

In section 6.101, we propose replacing the word geothermal with "Ground Source Heat Pump" to better describe the process occurring within these systems. In the event that is not possible, due to language in SB 786, we would also suggest "geothermal heat injection well" which again better describes the process.

In section 6.102, we propose that several definitions be added, modified, or deleted to be consistent with industry standards. The following proposed definitions (**BOLD**) are recommended for addition:

**Alternate Backfilling—A process used in areas where boreholes will not support a grout slurry. Materials for this method consist of:**

**(a) small gravel,**

(b) gravel/sand mixture, or

(c) a solid bentonite chip material

**Annular Space**—The space between the borehole wall and the heat exchange loop installed within it.

This space is typically filled with grout to protect groundwater by sealing the borehole. This is consistent with the TDLR definition in Rule §76.10(3).

**Aquifer**—A geologic formation that contains enough saturated permeable material to provide significant quantities of water to wells and springs. This definition is identical with the Texas Water Development Board definition.

**Casing**—A metal or plastic pipe installed into the borehole to prevent the sides from collapsing and to protect groundwater from contamination. The geology of the site determines the depth of casing needed.

**Grouting**—The material used to achieve an impervious seal in the borehole after the heat exchange loop has been installed. Grouting materials consist of a combination of:

(a) Bentonite,

(b) Cement,

(c) Thermally-enhanced material, or

(d) Other specific material as approved by the Director

**Heat Exchange Loop**—a conduit used in shallow closed-loop geothermal heat injection wells factory-manufactured by fusing a U-Bend fitting to HDPE dual coil pipe with fusion equipment for heat transfer. HDPE Loops and U-bend fittings are manufactured using virgin 4710, NSF certified material. Other forms of conduit shall be approved by the Director.

The following definitions are recommended to be modified, and again, language consistent with industry standards should be used.

(14) Shallow closed-loop geothermal **heat** injection well— a vertical or angled hole drilled into the ground that is part of a shallow closed-loop geothermal system. These boreholes typically range from 200 feet to 1000 feet, where heat exchange loops are installed to harness thermal energy from the earth.

(15) Shallow closed-loop **ground-source heat pump** system—A closed-loop geothermal **heat** injection well, including all **heat exchange loops** 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. All energy used from this type of well is consumed by the onsite infrastructure and is not provided to an energy market.

We propose the removal of definitions (11) – (13) as they do not apply to this specific industry and therefore unnecessary in this subchapter.

Given the specific nature of what this subchapter is being written for, we find it necessary to include in §6.103(b) the consideration of adding horizontal geothermal heat pump system and pond/lake geothermal heat pump systems as these are two additional closed-loop system types that do not require the need for a borehole/well, thus do not fall under the category of Class V Injection wells. We also feel that this section is best for providing clarity as to the regulation of systems constructed before January 6, 2025.

To provide clarity as to the intent of when Section §6.105 applies, we recommend adding to the beginning of Section §6.104(b) the following language: **In the event that a shallow closed-loop geothermal system will knowingly be out of compliance with this subchapter, the owner must submit to the Director a request for authorization, as required by §6.105 of this title.**

Section §6.105(3) proposes to be removed from these regulations as it does not meet the needs of shallow closed-loop geothermal injection wells, considering no pumps are installed in the borehole. Given such a recommendation, it would require an amendment to §6.105(a)(1) to remove any reference to a licensed pump installer. §6.105(b) should be changed to state that “any additives, constituents, or fluids” shall be reported on the “Comments Section” of the state well report form.

We recommend some wholesale changes to Section §6.106 to adopt standards relative to the industry. First, we propose the deletion of §6.106(a), considering the completion of shallow closed-loop geothermal heat injection wells are below the surface and not meant to be accessed upon completion.

Section §6.106(b)(1) and (b)(2), we propose replacing impervious bentonite with grouting, which would be defined in §6.102. Section §6.106(b)(2), we recommend writing as an “Alternate Backfill Procedure” using the following language.

§6.106(b)(2) In cases where backfilling to the surface is not achievable or where no groundwater or only one zone of groundwater is encountered, an alternate backfill method may be used to backfill the annular space up to 30 feet below the surface. The water well driller shall seal the top 30 feet with impervious grouting. It is also suggested that local entities (GCDs), when applicable, have some governance regarding when this procedure is necessary.

Section §6.106(b)(4) we propose should be rewritten to have a minimum diameter of 4 inches and be large enough to allow for...the rest of the section as written.

Section §6.106(b)(5), insert annular space which is defined to shorten verbage

Section §6.106(b)(6), we recommend replacing tubing with heat exchange loop as presented in §6.102. We also recommend in §6.106(b)(6) that a reference to ASTM D3035 be made, which is the appropriate standard for HDPE tubing.

Section §6.106(b)(7), we propose that any fused joints intended to be placed in the borehole be required to be constructed at the loop manufacturer facility. This would reduce improper fuses and instances of failed or leaking loops.

Section §6.106(b)(8) we suggest removing since it is addressed by allowing only HDPE heat exchange loop and suggested grouting methods.

Section §6.106(b)(9), we recommend removing this section as cooper is not used in today’s industry, as it is susceptible to corrosion, which can be a cause for potential groundwater contamination if a leak were to occur.

Section §6.106(b)(10), we suggest altering this section to exchange copper with HDPE for heat exchange loops.

Section §6.106(c)(1) – (3) is unnecessary for shallow closed-loop geothermal injection wells as casing reduces the potential for heat transfer and is not a component of the borehole completion. We recommend that these sections be removed.

Section §6.106(c)(4) in order to address the comment above, we suggest that this section be altered to read as such: shallow closed-loop geothermal injection wells are not required to be cased.

Section §6.106(c)(5), we recommend changing shall to may due to the circumstantial need for temporary casing.

Section §6.106(d) we would recommend changing the subtitle to “Heat Transfer Fluids.” We also recommend that in section §6.106(d)(1) potable water be added, propylene glycol be food-grade and ethanol be removed. This leaves only non-toxic and non-hazardous materials to be used as heat transfer fluids. With the removal of ethanol, this would also eliminate the need for Section §6.106(d)(2) and (3). To allow for some flexibility in the future, language that allows for alternative fluids to be used upon approval by the Director could be warranted. Also, because of the non-toxic and non-hazardous traits of the heat transfer fluids, section §6.107 can be expunged. We would also recommend adding a requirement for any additives used besides potable water that, in addition to being reported on the state well report, should also be displayed by the owner at the point of system service.

Section §6.108 is unnecessary because shallow closed-loop geothermal injection wells have no subsurface pumps, and HVAC regulations regulate any surface pumping system. While part of the system, the surface pump does not impact the construction and completion of the injection wells, which the Commission regulates.

Section §6.109(b) should afford the option to test with air or water.

Section §6.109(d), we suggest substituting potable water sources with adjacent property lines to be consistent with 16 TAC Ch. 76.

Section §6.109(e), we propose to remove “casing annulus or the gravel pack” as these are not components of shallow closed-loop geothermal injection wells.

Section §6.110, it is our understanding that a well report is not needed nor is encouraged for each well when multiple boreholes are drilled. Some flexibility needs to be allowed to meet the intent, such as the requirement for a schematic/map of the loop field. We also suggest adding to §6.110(b) the requirement of any additives, constituents, or fluids (other than potable water) to the state well report, and preferable in the Comments Section.

To avoid any confusion, we recommend changing §6.110(d) to read as follows: **A shallow closed-loop geothermal system, once drilled, installed, and operating, becomes a permanent fixture of the property. If the property is transferred,...**

We recommend some changes to Section §6.111(a) to be more achievable and reduce any chances for further disturbance or contamination. We recommend the following language (**BOLD**):

§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) **Remove all heat transfer fluid from the closed loop system and take necessary precautions to ensure groundwater protection; and**
  - (2) **Excavate to the top of the borehole and cut off the heat exchange loop at least three (3) feet below the surface. Pump the remaining loop full of bentonite or cement slurry. Allow the grout to fill the upper one (1) foot of the borehole. Fill the remaining hole with compacted earth.**
  - (3) **If the loop is blocked or damaged to the point that a slurry can not be pumped through the entire loop, the loop shall be capped using materials of the same or similar type. Fill the upper one (1) foot of the borehole with a bentonite or cement slurry and fill the remaining hole with compacted earth.**
  - (4) **If reasonable access to a heat exchange loop(s) does not exist, the loop may be abandoned in place and capped using materials of the same or similar type.**
- (b) Any fluids injected into the closed loop system shall not endanger fresh water.
- (c) Not later than the 30<sup>th</sup> 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 submitted to the Texas Department of Licensing and Regulation (TDLR) electronically through the Texas Well Report Submission and Retrieval System (TWRSRS).**

The suggested edits are included in the draft rules following this page for ease of reference. Again, we appreciate your willingness to take on this rule-making challenge and being open to working with those these rules will impact.

Respectfully,



Bobby Bazan  
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Texas Groundwater Association

§6.101.Purpose and Scope.

This subchapter implements the state program for shallow closed-loop geothermal systems under the jurisdiction of the Commission consistent with state and federal law, including laws related to protection of underground sources of drinking water.

§6.102.Definitions.

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

- (1) Alternate Backfilling – A process used in areas where boreholes will not support a grout slurry. Materials for this method consist of:
  - a. Small gravel,
  - b. Gravel/sand mixture, or
  - c. A solid bentonite chip material
- (2) Annular space – The space between the borehole wall and the heat exchange loop installed within it.
- (3) Aquifer – A geologic formation that contains enough saturated permeable material to provide significant quantities of water to wells and springs.
- (4) Casing – A metal or plastic pipe installed into the borehole to prevent the sides from collapsing and to protect groundwater from contamination.
- (15) Commission--The Railroad Commission of Texas.
- (23) Director--The director of the Oil and Gas Division or the director's delegate.
- (34) Fresh water--Groundwater containing 1000 parts per million (ppm) or less total dissolved solids.
- (45) 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.
- (6) Grouting – The material used to achieve an impervious seal in the borehole after the heat exchange loop has been installed. Grouting materials consist of a combination of:
  - a. bentonite,
  - b. cement,
  - c. thermally enhanced material, or
  - d. other specific material as approved by the Director
- (7) Heat Exchange Loop – a conduit used in shallow closed-loop geothermal heat injection wells factory manufactured by fusing a U-bend fitting to HDPE dual coil pipe with fusion equipment for heat transfer. HDPE loops and U-bend fittings are manufactured using virgin 4710, NSF certified material. Use of other forms of conduit shall require approval of the Director.
- (58) Individual permit--A permit, other than an authorization by rule or general permit, for a specific activity at a specific location.
- (69) Injection well--A well into which fluids are injected.
- (710) License number--The number assigned to a water well driller or pump installer by the Texas Department of Licensing and Regulation (TDLR).
- (811) 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.

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

(1013) Person--A natural person, corporation, organization, government, governmental subdivision or agency, business trust, estate, trust, partnership, association, or any other legal entity.

(11) 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.

(12) Point of injection--For a Class V well, the last accessible sampling point prior to fluids being released into the subsurface environment.

(13) Pump installer--A person who installs or repairs well pumps and equipment. The term does not include a person who:

(A) installs or repairs well pumps and equipment on the person's own property for the person's own use; or

(B) assists in pump installation under the direct supervision of an installer and is not primarily responsible for the installation.

(14) Shallow closed-loop geothermal **heat** injection well--An injection well **vertical or angled hole drilled into the ground** that is part of a shallow closed-loop geothermal system. These **boreholes typically range from 200 feet to 1000 feet, where heat exchange loops are installed to harness thermal energy from the earth.** ~~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.~~

(15) Shallow closed-loop geothermal **ground source heat pump** system--A closed-loop geothermal **heat** injection well, including all pumps and tubing **heat exchange loops, 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. All energy used from this type of well is consumed by the onsite infrastructure and is not provided to an energy market.

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

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

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

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

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

#### §6.103.Applicability and Compliance.

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

(b) Any shallow closed-loop geothermal systems in this state which were constructed before January 6, 2025 shall be grandfathered, unless altered, deteriorated, abandoned or determined by the Director to have

- (1) Encounter groundwater that is detrimental to human health and the environment or can 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.

(b)(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; or
- (2) other geothermal injection wells.
- (3) horizontal geothermal heat pump systems
- (4) pond/lake geothermal heat pump systems

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

§6.104. Authorization by Rule.

(a) 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.

(b) If a shallow closed-loop geothermal system is knowingly out of compliance with this subchapter, the owner must submit to the Director a request for authorization, as required by §6.105 of this title. The Director will review the request for authorization required by §6.105 of this title (relating to Authorization for a Shallow Closed-Loop Geothermal System) and the well report required by §6.110 of this title (relating to Well Reports).

(1) The Director will review the request for authorization 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; or
- (C) may otherwise adversely affect human health or the environment.

(2) If upon review of the request for authorization 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.

(c) 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.

§6.105. Authorization for a Shallow Closed-Loop Geothermal System.

(a) Request for authorization.

(1) Prior to commencing operations for a shallow closed-loop geothermal system, the owner of the system shall submit to the Director a request for authorization to drill the injection well.

The request 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), a licensed pump installer as required under 16 Texas Administrative Code §6.105(a)(3), and I agree to plug the well upon abandonment."

(2) All shallow closed-loop geothermal heat 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 heat injection well, an owner shall provide to the Director the name and TDLR license number of the TDLR water well driller.

(3) All pumps and other equipment associated with shallow closed-loop geothermal systems 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 heat 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 in the Water Quality Comments Section on the state well report form.

(c) Approval. A request for authorization for a shallow closed-loop geothermal system 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.

#### §6.106. Construction Standards.

(a) Surface completion. Water well drillers drilling a shallow closed-loop geothermal heat 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.

(b) Drilling and completion requirements.

(1) The water well driller shall backfill the annular space of a shallow closed-loop geothermal heat injection well to the total depth with impervious bentonite grouting, or a similar alternative impervious material that has been approved by the Director.

(2) The water well driller shall fill the top 30 feet with impervious bentonite, or a similar alternative impervious material that has been approved by the Director. Where no groundwater or only one zone of groundwater is encountered during drilling, sand, gravel, or drill cuttings may be used to backfill up to 30 feet from the surface. In cases where backfilling to the surface is not achievable or where no groundwater or only one zone of groundwater is encountered, an alternate backfill method may be used to backfill the annular space up to 30



feet below the surface. The water well driller shall seal the top 30 feet with impervious grouting. When using this method, any local government entities or groundwater conservation districts with groundwater protection regulations must be informed.

(3) 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.

(4) Borehole diameter shall, at a minimum, be no smaller than 4 inches and be large enough to 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 heat injection well. Heat exchange loop shall be installed for the purpose of filling the annulus between the tubing and the borehole annular space with sand and grout material.

(5) No section of the annulus between the tubing and borehole wall annular space shall remain open after completion of the well.

(6) For tubing heat exchange loop material and connection requirements, the applicable American Society for Testing and Materials (ASTM) standards for the polyethylene (PE) tubing material shall be used. Tubing 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.

(7) All heat exchange loop pipe connections to be placed in the borehole shall be connected by heat-fusion, electrofusion, or a similar joint process and completed by the manufacturer. In addition to heat fusion or electrofusion joints, non-metallic mechanical stab type insert fittings shall meet applicable ASTM standards.

(8) 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.

(9) 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.

(10) A water well driller shall obtain prior approval from the Director before installing any tubing heat exchange loop material other than copper HDPE in a well borehole.

(e) Casing requirements. The water well driller shall ensure the following casing requirements are met for each shallow closed-loop geothermal injection well.

(1) 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.

(2) 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."

(3) 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.

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

(52) Temporary casing shall **may** be installed to prevent overburden cave-in prior to the installation of tubing material and grouting of shallow closed-loop geothermal injection wells unless other means to temporarily stabilize the open boring are used. If temporary casing is not installed, the completion of well construction should proceed as soon as possible upon completion of the borehole.

(d) **Heat Transfer Fluids.**

(1) **Potable water and food-grade** Propylene glycol (Chemical Abstract Service (CAS) No. 57-55-6) and ethanol (CAS No. 64-17-5) are the only heat transfer additives a water well driller may use for shallow closed-loop geothermal **heat** injection wells.

(2) **Any other fluids used for heat transfer or antifreeze properties shall require approval by the Director.**

(2) Denatonium benzoate (CAS No. 3734-33-6), ethyl acetate (CAS No. 141-78-6), isopropanol (CAS No. 67-63-0), pine oil (CAS No. 8002-09-3), and tertiary butyl alcohol (CAS No. 75-65-0) may be used as denaturants for ethanol additives. A water well driller shall obtain prior approval from the Director before using any other antifreeze chemicals and denaturants.

(3) The owner and driller involved in the design and installation of the well system shall report the release of 10 pounds or more of ethanol to the ground surface or groundwater as a reportable quantity release under 40 CFR Part 302. If a shallow closed loop geothermal injection well consists of 20 percent ethanol by volume, then a release of as little as 7.6 gallons of water/ethanol solution meets the reportable quantity release threshold of 10 pounds of ethanol.

**§6.107. Leak Detection and Pressure Loss.**

A shallow closed loop geothermal system shall have automatic shutdown devices to minimize leaks of refrigerant, antifreeze, or oil in the event of a pressure or fluid loss.

**§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.

**§6.109. Operational Standards.**

(a) Safety. The following information shall be prominently displayed on the shallow closed-loop geothermal system:

(1) name and telephone number of the person to contact in the event of a system shutdown;

(2) name and telephone number of the person to contact for routine maintenance; and

(3) types of fluids used in the shallow closed-loop geothermal system.

(b) Pressure testing. Shallow closed-loop geothermal **heat** injection wells shall be pressure-tested with water **or air** 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) Sampling. Any required sampling shall be done at the point of injection, or as specified in a permit issued by the Commission under §6.104(b) of this title (relating to Authorization by Rule).

(d) Siting and setback. All wells shall be located at least 10 feet from ~~potable water sources~~ **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.

(e) Commingling prohibited. All shallow closed-loop geothermal **heat** 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 ~~through the borehole casing annulus or the gravel pack~~ and cause degradation of any aquifer containing fresh water.

(f) 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.

#### §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 ~~for each well drilled.~~ **A well report is not needed for each well constructed on one site, however a map or drawing of each well must be provided.**

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

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

(2) the county in which the well was drilled;

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

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

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

(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) the borehole diameter in inches;

(9) the bottom depth in feet;

(10) the drilling method;

(11) the driller's name; and

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

**(13) any additives, constituents, or fluids, other than potable water, must be included in the Comment Section.**

(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, becomes a permanent fixture of the property.** ~~If a well 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.

#### §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. ~~Remove all heat transfer fluid from the closed loop system and take necessary precautions to ensure groundwater protection;~~ 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.

Excavate to the top of the borehole and cut off the heat exchange loop at least three (3) feet below the surface. Pump the remaining loop full of bentonite or cement slurry. Allow the grout to fill the upper one (1) foot of the borehole. Fill the remaining hole with compacted earth.

(3) If the loop is blocked or damaged to the point that a slurry cannot be pumped through the entire loop, the loop shall be capped using materials of the same or similar type. Fill the upper one (1) foot of the borehole with a bentonite or cement slurry and fill the remaining hole with compacted earth.

(4) If reasonable access to a heat exchange loop(s) does not exist, the loop may be abandoned in place and capped using materials of the same or similar type.

(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 ~~signed statement that the well was plugged in accordance with this subchapter~~ completed copy of the well plugging report submitted to the Texas Department of Licensing & Regulation (TDLR) electronically through the Texas Well Report Submission and Retrieval System (TWRARS).

#### §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.