TITLE 16. ECONOMIC REGULATION

PART 1. RAILROAD COMMISSION OF TEXAS

CHAPTER 6. GEOTHERMAL RESOURCES

SUBCHAPTER A. SHALLOW CLOSED-LOOP GEOTHERMAL SYSTEMS

16 TAC §§6.101 - 6.112

The Railroad Commission of Texas (Commission) proposes new Chapter 6, relating to Geothermal Resources. Specifically, the Commission proposes Subchapter A of Chapter 6, relating to Shallow Closed-Loop Geothermal Systems, which includes proposed new §§6.101 - 6.112, relating to Purpose and Scope; Definitions; Applicability and Compliance; Authorization by Rule; Authorization for a Shallow Closed-Loop Geothermal System; Construction Standards; Leak Detection and Pressure Loss; Pump Installer Requirements; Operational Standards; Well Reports; Plugging; and Enforcement and Penalties, respectively. Replace "system" with "injection well".

The new rules are proposed to implement the requirements of Senate Bill 786 (88th Legislature, Regular Session, 2023). Senate Bill 786 amended Texas Water Code §27.037 to transfer regulatory authority of closed-loop geothermal injection wells to the Commission from the Texas Commission on Environmental Quality (TCEQ). Thus, the bill provided the Commission with jurisdiction and permitting authority for these wells. The TCEQ retains jurisdiction over ground-source air conditioning return flow wells, which are shallow open-loop geothermal injection wells. All other types of geothermal injection wells are now under the jurisdiction of the Commission.

Transferring regulatory authority for shallow closed-loop geothermal injection wells to the Commission will lessen the administrative burden for those who seek to drill and operate shallow closed-loop geothermal injection wells because it consolidates authority in fewer agencies. The proposed new rules retain the general process required for drilling and operating these types of wells. Some updates to the former process are proposed to provide flexibility for changes in innovation and technology.

As stated in proposed §6.101, the new rules proposed in Subchapter A of Chapter 6 specifically address shallow closed-loop geothermal injection wells, which are defined in proposed §6.102 as injection wells that are part of shallow closed-loop geothermal systems. 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. This parts per million standard is proposed to ensure consistency with definitions developed by the Texas Groundwater Protection Committee. Remove language regulating depth of Shallow closed-loop geothermal injection wells relative to TDS. These wells should be defined by depth, that being 200' to 1000'.

Section 6.102 also contains proposed definitions for other terms used throughout the subchapter such as fresh water, injection well, license number, pump installer, water well driller, and well report. Remove language referring to pump installer or licensed pump installer. All pumping is performed from surface and does not currently require a pump installers license issued by the TDLR.

Proposed §6.103 clarifies that the subchapter only applies to shallow closed-loop geothermal systems for which design, contract or construction is commenced after the effective date of proposed Subchapter A. The Commission anticipates that the effective date will be January 6, 2025, and the Commission proposes §6.103 with that date. If the timeline changes during the rulemaking process, the Commission will update the effective date upon adoption of the new subchapter. Replace "systems" with "injection wells". Adding "design, contract or" before construction could remedy excessive request for authorization.

Proposed §6.103 also clarifies that the subchapter does not apply to open-loop air-conditioning return flow wells or other geothermal injection wells. Open-loop air-conditioning return flow wells remain under the jurisdiction of the TCEQ. Other geothermal systems such as geothermal systems that generate energy for sale or transfer to an energy market are not addressed in proposed Subchapter A. A person shall not drill or operate another type of geothermal injection well unless that person holds a valid individual permit issued by the Commission.

Conversely, a person in compliance with Subchapter A may cause a shallow closed-loop geothermal system to be drilled and installed and may operate the system without obtaining an individual permit. In other words, a shallow closed-loop geothermal system is authorized by rule provided it is drilled, installed, and operated in accordance with proposed Subchapter A. Replace "system" with "injection well".

Proposed §6.104 states this general rule and provides for exceptions based on the Director's review. The Director will review an owner's request for authorization for a shallow closed-loop geothermal system submitted pursuant to proposed §6.105 and the well report required by proposed §6.110 to determine whether factors are present such that an individual permit or other further action is required. If after review of the request or well report, or at any other time, the Director finds that the shallow closed-loop geothermal injection well (1) encounters groundwater that is detrimental to human health and the environment or can cause pollution to land, surface water, or other groundwater, (2) may cause a violation of primary drinking water regulations under 40 CFR Part 142, or (3) may otherwise adversely affect human health or the environment,

then the Director may require the owner to obtain an individual permit, require the owner to take action to prevent the violation, or may refer the violation for enforcement action. Proposed §6.104(c) directs the owner of the system to cease injection operations if the Director makes such a determination. Injection operations shall not continue until the owner complies with the Director's requirements. Replace “system” with “injection well”.

It is our understanding that the intent of SB 786 is for the Commission is to regulate only the borehole construction of Shallow Closed-loop Geothermal Injection Wells. However, this may extend to any chemicals or water treatment added to the heat transfer fluid. Any chemicals used to make up the heat transfer fluid must be listed in the “comments section” of the submitted well report when sent to the RRC and be displayed by the owner at the point of system service.

Proposed §6.105 describes the procedure for obtaining Commission authorization for a shallow closed-loop geothermal system. Prior to commencing operations for a shallow closed-loop geothermal system, the owner of the system must submit a request for authorization to drill the well. The owner must sign the authorization, certifying that the owner will use the services of a licensed water well driller and a licensed pump installer, and that the owner agrees to plug the well upon abandonment. The request for authorization shall include the TDLR license numbers for the TDLR-licensed water well driller and the TDLR-licensed pump installer. Proposed subsection (b) requires the well driller to complete the state well report form required by TDLR and submit it to the Director within 30 days from the date the well construction is completed. Additional requirements regarding the well report are included in proposed §6.110. The Commission's Special Injection Permits Unit will review the request for authorization required by proposed §6.105 and will notify the owner when the well report is received by the Commission. Replace “system” with “injection well”.

Proposed §6.106 contains the construction standards with which the licensed water well driller must comply when drilling a shallow closed-loop geothermal injection well. Proposed subsection (a) contains the surface completion requirements, including the requirement to place a concrete slab or sealing block above the cement slurry around the well. Proposed subsection (a) also provides requirements for the concrete slab or sealing block. Proposed §6.106(b) contains the drilling and completion requirements for the licensed water well driller. Requirements for backfill material are included but the water well driller is also authorized to request the Director's approval for using an alternative material that is similarly impervious. Additional drilling and completion requirements are proposed in subsection (b)(3) - (10).

Casing requirements for shallow closed-loop geothermal injection wells are proposed in subsection (c) of §6.106. The licensed water well driller is responsible for complying with these requirements. Proposed subsection (d) of §6.106 outlines the fluids that may be used as antifreeze additives or denaturants for ethanol additives. Only propylene glycol and ethanol may be used as antifreeze additives for a shallow closed-loop geothermal injection well. Denatonium

benzoate, ethyl acetate, isopropanol, pine oil, and tertiary butyl alcohol may be used as denaturants for ethanol additives. A water well driller may request approval from the Director for use of other antifreeze chemicals and denaturants. Director approval is required before the water well driller uses any other chemical or denaturant.

Proposed §6.107 requires that all shallow closed-loop geothermal systems have automatic shutdown devices.

Proposed §6.108 contains the requirements for licensed pump installers. 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.

Standards for operating the shallow closed-loop geothermal system are proposed in §6.109. Requirements for safety, pressure testing, sampling, and siting and setback are proposed in subsections (a) - (d). Proposed subsection (e) prohibits commingling of aquifers or zones containing waters that are known to differ significantly in chemical quality. Proposed subsection (f) notes that site plans may be required by local jurisdictions.

Proposed §6.110 contains the requirement for a licensed water well driller to submit an electronic copy of the report required by §76.70 of this title (relating to Responsibilities of the Licensee -- State Well Reports) to the Director within 30 days of well completion for each well drilled. Section 6.110 also proposes minimum information that must be contained in the report. This information is consistent with the information currently required on the report under §76.70. Proposed §6.110(c) provides that filing an incomplete well report may prompt a notice of violation from the Commission. Failure to complete the well report within 30 days of the notice of violation may result in enforcement action. Proposed §6.110(d) contains the requirements for transferring ownership of a shallow closed-loop geothermal injection well and specifies that the transferee owner shall be responsible for plugging the well upon abandonment. Proposed subsection (e) allows the owner of the well to request that well reports be kept confidential. 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.

The Commission proposes §6.111 to outline plugging requirements for shallow closed-loop geothermal injection wells upon permanent discontinued use or abandonment. Proposed subsections (a) and (b) contain the technical requirements for plugging, and proposed subsection (c) requires the person who plugs the well to submit a signed statement to the Commission not later than the 30th day after the well is plugged. The Commission will coordinate with TDLR,

groundwater conservation districts, and Commission field offices to investigate complaints regarding abandoned and/or deteriorated shallow closed-loop geothermal injection wells.

Proposed §6.112 describes the process the Commission will follow to enforce violations of Subchapter A or the conditions of a permit issued under proposed §6.104(b). Section 6.112 also contains proposed penalties for violations.

Jared Ware, Analyst for the Oil and Gas Division, has determined there will be a small cost to the Commission as a result of the proposed new rules. The Commission's Special Injection Permits Unit will need to devote a portion of the responsibilities of two full-time employees to review authorizations for shallow closed-loop geothermal systems. So, a portion of those employees' salaries is attributed to enforcement of the proposed new rules. Mr. Ware has determined that for the first five years the new rules will be in effect, there will be no fiscal implications for local governments as a result of the new rules. Replace “system” with “injection wells”.

Mr. Ware has determined that the public benefit anticipated as a result of enforcing or administering the new rules is compliance with state statutory requirements and decreased regulatory burden due to consolidating regulatory functions with the Commission.

Mr. Ware has determined that for each year of the first five years that the proposed new rules will be in effect, there will be no additional economic costs for persons required to comply as a result of the proposed new rules. The new rules are proposed to implement the Commission's jurisdiction over shallow closed-loop geothermal injection systems, which were previously regulated by the TCEQ. Generally, the proposed new rules incorporate existing regulatory requirements and the process for persons required to comply is the same. Some persons required to comply may experience a decrease in costs due to the reduced administrative burden caused by consolidated jurisdiction in the Commission. Replace “system” with “injection wells”.

In accordance with Texas Government Code, §2006.002, the Commission has determined there will be no adverse economic effect on rural communities, small businesses or micro-businesses resulting from the proposed new rules. As discussed above, there will be no additional economic costs for persons required to comply as a result of adoption of the proposed new rules; therefore, the Commission has not prepared the economic impact statement or the regulatory flexibility analysis required under §2006.002.

The Commission has determined that the proposed rulemaking will not affect a local economy; therefore, pursuant to Texas Government Code, §2001.022, the Commission is not required to prepare a local employment impact statement for the proposed rules.

The Commission has determined that the proposed new rules do not meet the statutory definition of a major environmental rule as set forth in Texas Government Code, §2001.0225; therefore, a regulatory analysis conducted pursuant to that section is not required.

The Commission reviewed the proposed new rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §29.11(b)(4), nor would they affect

any action or authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §29.11(a)(3). Therefore, the proposed new rules are not subject to the Texas Coastal Management Program.

During the first five years that the rule would be in effect, the proposed new rules would not: increase fees paid to the agency; create or eliminate any employee positions; increase or decrease the number of individuals subject to the rules' applicability; expand, limit, or repeal an existing regulation; or affect the state's economy. The proposed new rules would not create or eliminate a government program, but would relocate administration of the program to a different state agency, consistent with Senate Bill 786 (88th Legislature, 2023). The new rules are not the sole cause of a need for increased future legislative appropriations; however, due to delegation to the Commission of several new initiatives from the Legislature, including administration of this program, the Commission will need increased appropriations in the future.

Comments on the proposal may be submitted to Rules Coordinator, Office of General Counsel, Railroad Commission of Texas, P.O. Box 12967, Austin, Texas 78711-2967; online at www.rrc.texas.gov/general-counsel/rules/comment-form-for-proposed-rulemakings; or by electronic mail to rulescoordinator@rrc.texas.gov. The Commission will accept comments until 5:00 p.m., on Tuesday, November 12, 2024. The Commission finds that this comment period is reasonable because the proposal and an online comment form will be available on the Commission's web site more than two weeks prior to *Texas Register* publication of the proposal, giving interested persons additional time to review, analyze, draft, and submit comments. The Commission encourages all interested persons to submit comments no later than the deadline. The Commission cannot guarantee that comments submitted after the deadline will be considered. For further information, call Mr. Ware at (512) 463-7336. The status of Commission rulemakings in progress is available at www.rrc.texas.gov/general-counsel/rules/proposed-rules. Once received, all comments are posted on the Commission's website at https://rrc.texas.gov/general-counsel/rules/proposed-rules/. If you submit a comment and do not see the comment posted at this link within three business days of submittal, please call the Office of General Counsel at (512) 463-7149. The Commission has safeguards to prevent emailed comments from getting lost; however, your operating system's or email server's settings may delay or prevent receipt.

The Commission proposes the new rules under Texas Water Code, §27.037, which gives the Commission jurisdiction over closed-loop geothermal injection wells and the authority to issue permits for closed-loop geothermal injection wells. Section 27.037 also requires the Commission to adopt rules necessary to administer the section and to regulate closed-loop geothermal injection wells.

Statutory authority: Texas Water Code, §27.037.

Cross-reference to statute: Texas Water Code, Chapter 27.

§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. Replace "system" with "injection wells", "systems" are not currently regulated by TCEQ or TDLR. Only the borehole is regulated.

§6.102.Definitions.

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

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

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

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

(4) 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.

(5) Individual permit--A permit, other than an authorization by rule or general permit, for a specific activity at a specific location. Also referred to as "Request for Authorization" of which, no standalone fee is required.

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

ADD - 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).

ADD – 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.

ADD – 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.

ADD – 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 enhancing material, or
D. Any combination of A, B and C or other specific material as approved by the Director
E. Alternate Grouting—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

ADD - 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. Any other forms of conduit shall be approved by the Director.

(7) License number--The number assigned to a water well driller or pump installer by the Texas Department of Licensing and Regulation (TDLR). Remove language referring to pump installer or licensed pump installer. All pumping is performed from surface and does not currently require a pump installers license issued by the TDLR.

(8) 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.

(9) Owner--The owner of a shallow closed-loop geothermal system subject to the requirements of this subchapter. Replace "system" with "injection well", "systems" are not currently regulated by TCEQ or TDLR. Only the borehole is regulated.

(10) 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. Definitions 11 – 13 should be deleted due to lack of relevance.

(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 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. Replace with "A heat injection borehole that is part of a shallow closed-loop ground source system. These boreholes typically range from 200' feet to 1000' feet. Remove language regulating depth of Shallow closed-loop geothermal systems relative to TDS. These boreholes should be defined by depth, that being 200' to 1000'.

(15) Shallow closed-loop geothermal system--A closed-loop geothermal injection well, including all pumps and tubing 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. Replace with: A closed-loop geothermal heat injection borehole including, loop, grouting and connections from the heat injection borehole 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 thermal energy used from this type of borehole 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. Replace "systems" with "injection wells". Adding "design, contract or" before construction could remedy excessive request for authorization.

(b) 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.

(c) 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. Insert "licensing" before requirements.

§6.104.Authorization by Rule. Consider adding: Shallow Closed – Loop Geothermal Injection Wells are allowable by rule. Installing contractors must also follow all state, local or GCD rules. "P-5" permitting is not required as these systems are not intended to be governed to oil and gas requirements.
"No standalone fee required"
A "Request for Authorization" Also referred to as "Individual Permit" or "Application for a Variance" to these rules can be made by contacting the Director.

(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. Replace "systems" with "injection well".

(b) 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). Replace "system" with "injection well".

(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. Replace “system” with “injection well”.

(a) Request for authorization. Add “other than by §6.104.Authorization by Rule.” , add “no standalone fee required”.

(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." Replace “system” with “injection well”. Remove language referring to pump installer or licensed pump installer. All pumping is performed from surface and does not currently require a pump installers license issued by the TDLR.

(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) 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. Replace “system” with “injection well”. Remove language referring to pump installer or licensed pump installer. All pumping is performed from surface and does not currently require a pump installers license issued by the TDLR.

(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 in the Water Quality Section on the state well report form. Replace “Water Quality Section” with “Comment Section”.

(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. Replace “system” with “injection well”.

§6.106Construction Standards. We recommend making some wholesale changes to Section §6.106 to adopt standards related to the industry.

(a) 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. 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.

(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. Remove N/A

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

(3) A pitless adapter may be used if: Remove N/A

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

(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. Remove N/A, shallow closed-loop injection wells or bores are not permanently cased.

(b) Drilling and completion requirements. 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 allowing an "Alternate Grouting" using the following language.

A. Alternate Grouting - 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

(1) The water well driller shall backfill the annular space of a shallow closed-loop geothermal injection well to the total depth with impervious bentonite, 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. §6.106(b)(2) Remove "sand, gravel, or drill cuttings" and replace with "Alternate Grouting". This allows in cases where normal grouting to the surface is not achievable or where no groundwater or only one zone of groundwater is encountered, an alternate grouting method may be used to grout 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 and or allowable.

(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, 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. Section§6.106(b)(4) we propose should be rewritten to "Borehole diameter should be of a large enough diameter to freely install loop, tremie line (if used) and grout or backfill material but at a minimum be no smaller than 4" diameter".

(5) No section of the annulus between the tubing and borehole wall shall remain open after completion of the well. §6.106(b)(5) and (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.

(6) For tubing material and connection requirements, the applicable American Society for Testing and Materials (ASTM) standards for the polyethylene (PE) tubing material shall be used. Tubing 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. All mention of "tubing" in this section should be replaced with "loop".

(7) 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. §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 is typically specified by the design teams and supported by trade organization. Delete the last sentence referencing electrofusion joints and non-metallic mechanical stab-type insert fittings as these types of connections are not allowed by design teams or trade organizations to be used in a borehole.

(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. §6.106(b)(8) we suggest substituting HDPE tubing in place of "a plastic loop." We also recommend that alternate backfill methods and materials be allowed and approved when necessary.

(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. §6.106(b)(9), we recommend removing this section as cooper is not typically used in Texas. Copper or other materials should require an individual permit.

(10) A water well driller shall obtain prior approval from the Director before installing any tubing material other than copper in a well. §6.106(b)(10), we suggest altering this section to replace "copper" with "HDPE" for heat exchange loops.

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

(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.

(4) Shallow closed-loop geothermal injection wells are not required to be cased into bedrock. §6.106(c)(4) we suggest that this section be altered to read as such: shallow closed-loop geothermal injection wells are not required to be cased.

(5) Temporary casing shall 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. §6.106(c)(5), we recommend changing "shall" to "may" due to the circumstantial need for temporary casing. Replace "tubing material and grout" with "loop and grouting material" and remove the last sentence and replace with "In every case, well construction should be completed as soon as possible".

(d) Fluid. 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, non-hazardous, non-toxic 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.

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

(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. Replace "system" with "injection well".

§6.107.Leak Detection and Pressure Loss. See comments in Section §6.106(d)

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. Section §6.108 is unnecessary and should be removed because shallow closed-loop geothermal injection wells have no subsurface pumps, and HVAC regulations regulate any surface pumping. Current regulations do not require pump installers to be licensed by the TDLR. While part of the system, the surface pump does not impact the construction and completion of the injection wells, which the Commission regulates.

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. §6.109.Operational Standards (a), being that no part of the shallow closed-loop geothermal injection well is not accessible or visible from surface on the exterior of a building or residence and that these systems are operated by the property owner, displaying information in (a), (1) - (3) should not be required and could cause an owner undue burden and restrict the owner from protection provided by Texas Occupations Code §1901.251. (a) (2) if posted could limit an owner's option for hiring a service or maintenance person if different that the person listed. The requirements of §6.109. (a) (3) is addressed by reporting requirements in §6.110 relating to Well Reports.

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

(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). Being that no physical injection or extraction of any commodity is occurring and that Shallow closed-loop geothermal injection wells are transferring heat only, all sampling requirements should be removed.

(d) Siting and setback. All wells shall be located at least 10 feet from potable water sources 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. §6.109(d), we suggest substituting "potable water sources" with "adjacent property lines" to be consistent with 16 TAC Ch. 76.

(e) 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 through the borehole-casing annulus or the gravel pack and cause degradation of any aquifer containing fresh water. §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.

(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. 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 sketch/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 preferrable in the Comments Section.

(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. Replace "well drilled" with each "project or phase of a project". Remove the requirement for individual well reports for each well drilled where multiple wells are installed.

(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 used to make up the "heat transfer fluid" 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) If a well 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. Section §6.110 (d) requiring an owner to transfer a well to the buyer of a property should be removed as to be treated and viewed more in line as to how a water well conveys with a property and not how oil and gas assets are bought and sold separate from the property. This does not relieve the new owner of responsibility plugging requirements if applicable.

(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: Replace (a) (1 and (2) with the following to more accurately address shallow closed-loop geothermal wells.

(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 the same or similar type materials.

(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. Replace "system" with "injection well".

(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. Replace (c) with "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 their well plugging report to the Texas Department of Licensing and Regulation (TDLR) electronically through the Texas Well Report Submission and Retrieval System (TWRSRS)". This requirement will allow licensed drillers to fulfill licensing requirements of the TDLR.

§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.

The agency certifies that legal counsel has reviewed the proposal and found it to be within the state agency's legal authority to adopt.

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To make a compelling case for amending Texas SB 786 to replace the term "geothermal injection well" with "ground source heat pump borehole," it’s essential to clarify how this change aligns with industry standards, supports economic growth, and aids environmental goals. Here’s a structured argument to support the amendment:

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1. Clarifying Industry Standards and Distinctions

- **Technical Accuracy:** In the HVAC and renewable energy industries, the term “geothermal injection well” is associated with high-temperature geothermal energy production, which involves injecting and extracting water or steam deep into the earth. This process differs fundamentally from the operation of ground source heat pump (GSHP) systems, which utilize “boreholes” to exchange thermal energy with the earth at relatively shallow depths (typically 200–1000 feet).
- **Avoiding Regulatory Confusion:** By using "ground source heat pump borehole" to describe the drilling required for GSHP systems, the legislation will avoid misapplication of regulations intended for geothermal power generation. This precision helps Texas regulators, drilling professionals, and HVAC installers work with terms that reflect their respective industries and reduces the potential for regulatory misinterpretation.

2. Supporting Economic Growth in Texas

- **Promoting Workforce Development:** The GSHP industry represents a growing sector of the Texas economy, with applications in residential, commercial, and institutional settings. Clear terminology supports training and workforce development, allowing Texas to foster a workforce adept in ground source heat pump technology, including drilling, installation, and maintenance of boreholes. This shift provides greater employment opportunities and encourages skill development within the local workforce.
- **Encouraging Business Expansion:** GSHP systems have gained popularity due to their energy efficiency and cost-saving potential, particularly in commercial real estate, schools, and government buildings. Distinguishing “boreholes” from “injection wells” makes it easier for Texas businesses to access tax incentives, grants, and funding opportunities targeted at renewable heating and cooling systems. This clarity could attract more GSHP projects to Texas, benefiting local businesses and contributing to the state’s economic resilience.

3. Aligning with Environmental and Energy Goals

- **Advancing Energy Efficiency:** Ground source heat pumps are among the most efficient and sustainable HVAC systems available. Unlike geothermal power plants, which are limited to specific geological conditions, GSHP systems can be implemented widely, reducing reliance on fossil fuels and lowering greenhouse gas emissions. Using terminology that correctly describes GSHP technology supports Texas's commitment to sustainable energy practices and allows for more accurate reporting and assessment of the state's renewable energy capacity.
- **Reducing Environmental Impact:** Ground source heat pump boreholes, by design, have minimal impact on groundwater resources, as they do not involve fluid injection or withdrawal from geological formations. This distinction is significant because it aligns with Texas's goals of protecting water resources while expanding sustainable energy solutions. Reframing the terminology helps the state enact appropriate environmental protections that recognize the lower environmental footprint of GSHP systems compared to geothermal power systems.

4. Facilitating Stakeholder Support and Alignment

- **Industry and Public Sector Collaboration:** A clear and accurate language amendment in SB 786 aligns Texas with national standards, as organizations like the International Ground Source Heat Pump Association (IGSHPA) and the U.S. Department of Energy already use terms like "boreholes" in reference to GSHP systems. By adopting consistent terminology, Texas facilitates easier collaboration with national and international stakeholders, allowing for better knowledge sharing, innovation, and investment in GSHP technology.
- **Enhancing Public Awareness and Understanding:** The term "geothermal injection well" can create misunderstandings among the public and potential clients, who might associate it with the challenges, costs, and environmental impacts of deep geothermal power systems. Using "ground source heat pump borehole" more accurately conveys that GSHP systems are safe, non-invasive, and adaptable for residential and commercial properties, thereby encouraging broader acceptance and adoption across the state.

By adopting the proposed terminology amendment, Texas would not only improve the clarity and accuracy of SB 786 but also strengthen its position as a leader in sustainable energy practices. This small yet significant change would foster economic growth, advance environmental goals, and encourage the expansion of the ground source heat pump industry—ultimately benefiting the state, its citizens, and its natural resources.