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 WAYNE CHRISTIAN, *COMMISSIONER*
 JIM WRIGHT, *COMMISSIONER*



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RAILROAD COMMISSION OF TEXAS

OFFICE OF GENERAL COUNSEL

MEMORANDUM

TO: Chairman Christi Craddick
 Commissioner Wayne Christian
 Commissioner Jim Wright

FROM: Haley Cochran, Assistant General Counsel

THROUGH: Alexander C. Schoch, General Counsel

DATE: September 24, 2024

SUBJECT: Proposed new rules in Subchapter A of 16 TAC Chapter 6, relating to Geothermal Resources

September 24, 2024		
Approved	Denied	Abstain
<small>DS</small> 		
<small>DS</small> 		
<small>DS</small> 		

Attached is Staff's recommendation to publish proposed new rules in 16 Texas Administrative Code Chapter 6, relating to Geothermal Resources. Specifically, Staff proposes new rules in Subchapter A, relating to Shallow Closed-Loop Geothermal Systems.

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. Water Code §27.037 directs the Commission to adopt rules necessary to administer the section and to regulate closed-loop geothermal injection wells.

Staff requests the Commission's approval to publish the proposed new rules in the *Texas Register* for public comment. If approved at conference on September 24th, the proposal should appear in the October 11th issue of the *Texas Register*. The proposal and an online comment form would also be made available on the Commission's website, giving interested persons more than two additional weeks to review and submit comments to the Commission.

Cc: Danny Sorrells, Acting Executive Director and Director of the Oil and Gas Division
 Jared Ware, Analyst, Oil and Gas Division
 Leslie Savage, Chief Geologist

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

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

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

20 As stated in proposed §6.101, the new rules proposed in Subchapter A of Chapter 6 specifically
21 address shallow closed-loop geothermal injection wells, which are defined in proposed §6.102 as
22 injection wells that are part of shallow closed-loop geothermal systems. These types of wells are limited
23 to a depth of formations that contain water with a total dissolved solids content of 1000 parts per million
24 (ppm) or less. This parts per million standard is proposed to ensure consistency with definitions
25 developed by the Texas Groundwater Protection Committee.

26 Section 6.102 also contains proposed definitions for other terms used throughout the subchapter
27 such as fresh water, injection well, license number, pump installer, water well driller, and well report.

28 Proposed §6.103 clarifies that the subchapter only applies to shallow closed-loop geothermal
29 systems for which construction is commenced after the effective date of proposed Subchapter A. The
30 Commission anticipates that the effective date will be January 6, 2025, and the Commission proposes
31 §6.103 with that date. If the timeline changes during the rulemaking process, the Commission will update
32 the effective date upon adoption of the new subchapter.

33 Proposed §6.103 also clarifies that the subchapter does not apply to open-loop air-conditioning
34 return flow wells or other geothermal injection wells. Open-loop air-conditioning return flow wells

1 remain under the jurisdiction of the TCEQ. Other geothermal systems such as geothermal systems that
2 generate energy for sale or transfer to an energy market are not addressed in proposed Subchapter A. A
3 person shall not drill or operate another type of geothermal injection well unless that person holds a valid
4 individual permit issued by the Commission.

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

9 Proposed §6.104 states this general rule and provides for exceptions based on the Director's
10 review. The Director will review an owner's request for authorization for a shallow closed-loop
11 geothermal system submitted pursuant to proposed §6.105 and the well report required by proposed
12 §6.110 to determine whether factors are present such that an individual permit or other further action is
13 required. If after review of the request or well report, or at any other time, the Director finds that the
14 shallow closed-loop geothermal injection well (1) encounters groundwater that is detrimental to human
15 health and the environment or can cause pollution to land, surface water, or other groundwater, (2) may
16 cause a violation of primary drinking water regulations under 40 CFR Part 142, or (3) may otherwise
17 adversely affect human health or the environment, then the Director may require the owner to obtain an
18 individual permit, require the owner to take action to prevent the violation, or may refer the violation for
19 enforcement action. Proposed §6.104(c) directs the owner of the system to cease injection operations if
20 the Director makes such a determination. Injection operations shall not continue until the owner complies
21 with the Director's requirements.

22 Proposed §6.105 describes the procedure for obtaining Commission authorization for a shallow
23 closed-loop geothermal system. Prior to commencing operations for a shallow closed-loop geothermal
24 system, the owner of the system must submit a request for authorization to drill the well. The owner must
25 sign the authorization, certifying that the owner will use the services of a licensed water well driller and a
26 licensed pump installer, and that the owner agrees to plug the well upon abandonment. The request for
27 authorization shall include the TDLR license numbers for the TDLR-licensed water well driller and the
28 TDLR-licensed pump installer. Proposed subsection (b) requires the well driller to complete the state well
29 report form required by TDLR and submit it to the Director within 30 days from the date the well
30 construction is completed. Additional requirements regarding the well report are included in proposed
31 §6.110. The Commission's Special Injection Permits Unit will review the request for authorization
32 required by proposed §6.105 and will notify the owner when the well report is received by the
33 Commission.

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

10 Casing requirements for shallow closed-loop geothermal injection wells are proposed in
11 subsection (c) of §6.106. The licensed water well driller is responsible for complying with these
12 requirements. Proposed subsection (d) of §6.106 outlines the fluids that may be used as antifreeze
13 additives or denaturants for ethanol additives. Only propylene glycol and ethanol may be used as
14 antifreeze additives for a shallow closed-loop geothermal injection well. Denatonium benzoate, ethyl
15 acetate, isopropanol, pine oil, and tertiary butyl alcohol may be used as denaturants for ethanol additives.
16 A water well driller may request approval from the Director for use of other antifreeze chemicals and
17 denaturants. Director approval is required before the water well driller uses any other chemical or
18 denaturant.

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

21 Proposed §6.108 contains the requirements for licensed pump installers. The pump installer shall
22 (1) verify all owner information prior to installing any components of a shallow closed-loop geothermal
23 system; (2) verify that all the pumps, tubing, and connections from the well to the infrastructure and the
24 geothermal heat exchange system are installed, tested, and backfilled in a manner that is consistent with
25 this subchapter and any other applicable local, state, or federal guidelines, regulations, and ordinances; (3)
26 install all subsurface infrastructure such as loops or tubing; and (4) comply with all other applicable state
27 regulations, statutes, and local ordinances.

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

33 Proposed §6.110 contains the requirement for a licensed water well driller to submit an electronic
34 copy of the report required by §76.70 of this title (relating to Responsibilities of the Licensee – State Well

1 Reports) to the Director within 30 days of well completion for each well drilled. Section 6.110 also
2 proposes minimum information that must be contained in the report. This information is consistent with
3 the information currently required on the report under §76.70. Proposed §6.110(c) provides that filing an
4 incomplete well report may prompt a notice of violation from the Commission. Failure to complete the
5 well report within 30 days of the notice of violation may result in enforcement action. Proposed §6.110(d)
6 contains the requirements for transferring ownership of a shallow closed-loop geothermal injection well
7 and specifies that the transferee owner shall be responsible for plugging the well upon abandonment.
8 Proposed subsection (e) allows the owner of the well to request that well reports be kept confidential. If
9 the Commission receives a request under the Texas Public Information Act (PIA), Texas Government
10 Code, Chapter 552, for materials that have been designated confidential, the Commission will notify the
11 filer of the request in accordance with the provisions of the PIA so that the filer can take action with the
12 Office of the Attorney General to oppose release of the materials.

13 The Commission proposes §6.111 to outline plugging requirements for shallow closed-loop
14 geothermal injection wells upon permanent discontinued use or abandonment. Proposed subsections (a)
15 and (b) contain the technical requirements for plugging, and proposed subsection (c) requires the person
16 who plugs the well to submit a signed statement to the Commission not later than the 30th day after the
17 well is plugged. The Commission will coordinate with TDLR, groundwater conservation districts, and
18 Commission field offices to investigate complaints regarding abandoned and/or deteriorated shallow
19 closed-loop geothermal injection wells.

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

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

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

32 Mr. Ware has determined that for each year of the first five years that the proposed new rules will
33 be in effect, there will be no additional economic costs for persons required to comply as a result of the
34 proposed new rules. The new rules are proposed to implement the Commission's jurisdiction over shallow

1 closed-loop geothermal injection systems, which were previously regulated by the TCEQ. Generally, the
2 proposed new rules incorporate existing regulatory requirements and the process for persons required to
3 comply is the same. Some persons required to comply may experience a decrease in costs due to the
4 reduced administrative burden caused by consolidated jurisdiction in the Commission.

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

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

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

16 The Commission reviewed the proposed new rules and found that they are neither identified in
17 Coastal Coordination Act Implementation Rules, 31 TAC §29.11(b)(4), nor would they affect any action
18 or authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §29.11(a)(3).
19 Therefore, the proposed new rules are not subject to the Texas Coastal Management Program.

20 During the first five years that the rule would be in effect, the proposed new rules would not:
21 increase fees paid to the agency; create or eliminate any employee positions; increase or decrease the
22 number of individuals subject to the rules' applicability; expand, limit, or repeal an existing regulation; or
23 affect the state's economy. The proposed new rules would not create or eliminate a government program,
24 but would relocate administration of the program to a different state agency, consistent with Senate Bill
25 786 (88th Legislature, 2023). The new rules are not the sole cause of a need for increased future legislative
26 appropriations; however, due to delegation to the Commission of several new initiatives from the
27 Legislature, including administration of this program, the Commission will need increased appropriations
28 in the future.

29 Comments on the proposal may be submitted to Rules Coordinator, Office of General Counsel,
30 Railroad Commission of Texas, P.O. Box 12967, Austin, Texas 78711-2967; online at
31 www.rrc.texas.gov/general-counsel/rules/comment-form-for-proposed-rulemakings; or by electronic mail
32 to rulescoordinator@rrc.texas.gov. The Commission will accept comments until 5:00 p.m., on Tuesday,
33 November 12, 2024. The Commission finds that this comment period is reasonable because the proposal
34 and an online comment form will be available on the Commission's web site more than two weeks prior

1 to Texas Register publication of the proposal, giving interested persons additional time to review, analyze,
2 draft, and submit comments. The Commission encourages all interested persons to submit comments no
3 later than the deadline. The Commission cannot guarantee that comments submitted after the deadline
4 will be considered. For further information, call Mr. Ware at (512) 463-7336. The status of Commission
5 rulemakings in progress is available at www.rrc.texas.gov/general-counsel/rules/proposed-rules. Once
6 received, all comments are posted on the Commission's website at [https://rrc.texas.gov/general-](https://rrc.texas.gov/general-counsel/rules/proposed-rules/)
7 [counsel/rules/proposed-rules/](https://rrc.texas.gov/general-counsel/rules/proposed-rules/). If you submit a comment and do not see the comment posted at this link
8 within three business days of submittal, please call the Office of General Counsel at (512) 463-7149. The
9 Commission has safeguards to prevent emailed comments from getting lost; however, your operating
10 system's or email server's settings may delay or prevent receipt.

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

15 Statutory authority: Texas Water Code, §27.037.

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

17

18 Subchapter A--Shallow Closed-Loop Geothermal Systems

19

20 §6.101. Purpose and Scope

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

24

25 §6.102. Definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

26 (14) Shallow closed-loop geothermal system--A closed-loop geothermal injection well, including
27 all pumps and tubing and connections from the injection well to the infrastructure and the geothermal heat
28 exchange system, that operates as a heat source or heat sink in concert with a heating, ventilation, and air
29 conditioning system designed to heat or cool infrastructure. All energy used from this type of well is
30 consumed by the onsite infrastructure and is not provided to an energy market.

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

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

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

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

4 (19) Water Well Driller --A person or company possessing a water well driller’s license issued by
 5 TDLR.

6 (20) Well report--The State of Texas Well Report administered by TDLR.
 7

8 §6.103. Applicability and Compliance.

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

11 (b) This subchapter does not apply to:

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

14 (2) other geothermal injection wells.

15 (c) Compliance with this subchapter does not relieve the driller or installer from compliance with
 16 the requirements of TDLR regulations adopted under Texas Occupations Code, Chapters 1901 and 1902.
 17

18 §6.104. Authorization by Rule.

19 (a) An owner in compliance with this subchapter is authorized by rule to cause to be drilled and
 20 installed and to operate a shallow closed-loop geothermal system and is not required to obtain an
 21 individual permit except as provided by subsection (b) of this section.

22 (b) The Director will review the request for authorization required by §6.105 of this title (relating
 23 to Authorization for a Shallow Closed-Loop Geothermal System) and the well report required by §6.110
 24 of this title (relating to Well Reports).

25 (1) The Director will review the request for authorization and the well report to determine
 26 whether the shallow closed-loop geothermal injection well:

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

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

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

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

- 1 (A) require the owner to obtain an individual permit;
- 2 (B) require the owner to take such actions (including, where required, closure of
- 3 the injection well) as may be necessary to prevent the violation; or
- 4 (C) refer the violation for enforcement action.

5 (c) If the Director makes a determination under subsection (b) of this section, the owner shall

6 cease injection operations until the owner complies with the Director's requirements. The owner may

7 request a hearing to contest the Director's determination.

8

9 §6.105. Authorization for a Shallow Closed-Loop Geothermal System.

10 (a) Request for Authorization.

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

12 owner of the system shall submit to the Director a request for authorization to drill the injection well. The

13 request shall be signed by the owner, include the TDLR license numbers required by paragraphs (2) and

14 (3) of this subsection, and include the following statement: "I declare under penalties prescribed in

15 Section 91.143, Texas Natural Resources Code, that I will use the services of a licensed water well driller

16 as required under 16 Texas Administrative Code §6.105(a)(2), a licensed pump installer as required under

17 16 Texas Administrative Code §6.105(a)(3), and I agree to plug the well upon abandonment."

18 (2) All shallow closed-loop geothermal injection wells shall be drilled and completed by

19 a water well driller who holds a current and valid water well driller's license issued by TDLR. Prior to

20 commencing operations for a shallow closed-loop geothermal injection well, an owner shall provide to

21 the Director the name and TDLR license number of the TDLR water well driller.

22 (3) All pumps and other equipment associated with shallow closed-loop geothermal

23 systems shall be installed by a pump installer who holds a current and valid pump installer's license

24 issued by TDLR. Prior to commencing installation of the pumps and other equipment, an owner shall

25 provide to the Director the name and TDLR license number of the pump installer.

26 (b) Inventory. Drillers of shallow closed-loop geothermal injection wells authorized by rule shall

27 inventory wells after construction by completing the TDLR state well report form and submitting the

28 form to the Director within 30 days from the date the well construction is completed. Any additives,

29 constituents, or fluids (other than potable water) that are used in the closed loop system shall be reported

30 in the Water Quality Section on the state well report form.

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

32 reviewed by the Commission's Special Injection Permits (SIP) Unit. The SIP Unit will notify the owner

33 when the TDLR state well report form is approved by the Commission. The owner may operate the

34 system as soon as the owner receives the SIP Unit's approval.

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§6.106 Construction Standards.

(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.

(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 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.

(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.

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

(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.

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

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

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

11 (10) A water well driller shall obtain prior approval from the Director before installing
12 any tubing material other than copper in a well.

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

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

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

23 (3) If the use of a steel or polyvinyl chloride (PVC) sleeve is necessary to prevent
24 possible damage to the casing, the steel sleeve shall be a minimum of 3/16 inches in thickness and the
25 PVC sleeve shall be a minimum of ASTM D1785 Schedule 80 sun-resistant and 24 inches in length. Any
26 sleeve shall extend 12 inches into the cement slurry.

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

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

33 (d) Fluid.

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

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

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

13
14 §6.107. Leak Detection and Pressure Loss.

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

17
18 §6.108. Pump Installer Requirements.

19 The pump installer shall:

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

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

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

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

28
29 §6.109. Operational Standards.

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

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

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

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

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

5 (c) Sampling. Any required sampling shall be done at the point of injection, or as specified in a
6 permit issued by the Commission under §6.104(b) of this title (relating to Authorization by Rule).

7 (d) Siting and Setback. All wells shall be located at least 10 feet from potable water sources and
8 sewer lines, and at least 25 feet from potential sources of contamination that include but are not limited to
9 septic tanks/fields, livestock pens, or material storage facilities.

10 (e) Commingling prohibited. All shallow closed-loop geothermal injection wells shall be
11 completed so that aquifers or zones containing waters that are known to differ significantly in chemical
12 quality are not allowed to commingle through the borehole-casing annulus or the gravel pack and cause
13 degradation of any aquifer containing fresh water.

14 (f) Local regulation. The Commission does not require the submittal of site plans for wells
15 authorized by rule under this subchapter. However, a site plan may be required by a local health agent,
16 other local governmental entity, and/or a groundwater conservation district.

17

18 §6.110. Well Reports.

19 (a) The water well driller is required by §76.70 of this title (relating to Responsibilities of the
20 Licensee – State Well Reports) to submit a well report to TDLR electronically through the Texas Well
21 Report Submission and Retrieval System (TWRSRS). The driller shall provide an electronic copy of the
22 well report to the Director within 30 days of well completion for each well drilled.

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

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

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

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

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

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

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

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

33 (8) the borehole diameter in inches;

34 (9) the bottom depth in feet;

- 1 (10) the drilling method;
2 (11) the driller's name; and
3 (12) the water well driller's TDLR license number.

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

6 (d) If a well is transferred, both the transferor owner and the transferee owner shall notify the
7 Commission of the transfer within 30 days of the date of the transfer. The transferee owner shall be
8 responsible for plugging the well upon abandonment.

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

16
17

18 §6.111. Plugging.

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

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

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

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

27 (c) Not later than the 30th day after the date the well is plugged, a driller or well owner who
28 plugs an abandoned well shall submit to the Commission a signed statement that the well was plugged in
29 accordance with this subchapter.

30

31 §6.112. Enforcement and Penalties.

32 (a) A well which violates any requirement of this subchapter or a condition of a permit issued
33 under §6.104(b) of this title (relating to Authorization by Rule) is subject to appropriate enforcement
34 action. The Director may require owners or drillers to submit additional information deemed necessary to

1 protect fresh water. If the required information is not submitted, the owner may be prohibited from using
2 the well until the information is received by the Director.

3 (b) If a person violates any requirement of this subchapter or a condition of a permit issued under
4 §6.104(b) of this title, the person may be assessed a civil penalty by the Commission. The penalty may
5 not exceed \$10,000 a day for each violation. Each day a violation continues may be considered a separate
6 violation. In determining the amount of the penalty, the Commission will consider the person's history of
7 previous violations, the seriousness of the violation, any hazard to the health or safety of the public, and
8 the demonstrated good faith of the person.

9

10

11 This agency hereby certifies that the proposal has been reviewed by legal counsel and found to be
12 within the agency's authority to adopt.

13 Issued in Austin, Texas on September 24, 2024.

14 Filed with the Office of the Secretary of State on September 24, 2024.

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Signed by:

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Haley Cochran

Assistant General Counsel, Office of General Counsel

Railroad Commission of Texas