RAILROAD COMMISSION OF TEXAS
OFFICE OF GENERAL COUNSEL

M E M O R A N D U M

TO: Chairman Christi Craddick
Commissioner Wayne Christian
Commissioner Jim Wright

FROM: Haley Cochran, Assistant General Counsel
Office of General Counsel

THROUGH: Alexander C. Schoch, General Counsel

DATE: December 17, 2024

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

Attached is Staff's recommendation to adopt 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 Commission adopts the new rules 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.

On September 24, 2024, the Commission approved the publication of the proposed new rules in the Texas Register for a public comment period, which ended on November 12, 2024. Staff recommends that the Commission adopt the new rules with changes to the proposed text published in the October 11, 2024, issue of the Texas Register (49 TexReg 8261). The recommended changes are described in the attached adoption preamble.

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

The Railroad Commission of Texas (Commission) adopts new Chapter 6, relating to Geothermal Resources. Specifically, the Commission adopts Subchapter A of Chapter 6, relating to Shallow Closed-Loop Geothermal Systems, which includes new §§6.101-6.106, and 6.108-6.112, relating to Purpose and Scope; Definitions; Applicability and Compliance; Authorization by Rule; Authorization for a Shallow Closed-Loop Geothermal System; Construction Standards; Pump Installer Requirements; Operational Standards; Well Reports; Plugging; and Enforcement and Penalties, respectively. Sections 6.108 and 6.112 are adopted without changes and §§6.101-6.106, and 6.109-6.111 are adopted with changes to the proposed text as published in the October 11, 2024, issue of the Texas Register (49 TexReg 8261). Section 6.107 is withdrawn. The text of the rules adopted without changes from the proposal will not be republished.

The new rules 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 new rules retain the general process required for drilling and operating these types of wells. Some updates to the former process are adopted to provide flexibility for changes in innovation and technology.

The Commission received comments from 17 commenters, three of which were associations (Texas Groundwater Association (“TGWA”), Sierra Club, Lone Star Chapter (“Sierra Club”), and Texas Geothermal Energy Thermal Alliance (“TxGEA”)), and 14 of which were individuals. Two individuals provided general statements that they agree with all comments and proposed amendments provided by TGWA. The Commission notes that any subsequent reference to comments made by TGWA are to be construed to include the support of these two individuals. A group of 12 other individuals provided separate copies of the same comments, and thus will be subsequently referred to as “the 12 individuals.” The Commission greatly appreciates the comments provided by all individuals and associations.

TxGEA commented that it has reviewed the proposed rules and supports them without any recommended amendments. The Commission appreciates TxGEA’s comments and continued support of this rulemaking.

TGWA made general comments suggesting that the Commission develop a "best practice guideline," or similar document, using ANSI CSA, IGHSA C448 as a reference. The Commission will consider developing guidelines to assist industry in complying with these rules. The Commission also understands that there is an existing memorandum of understanding between TCEQ, Texas Department of Licensing and Regulation (TDLR), and groundwater conservation districts, and the Commission will coordinate with the entities to create a new memorandum of understanding that is consistent with these rules to provide additional clarity.

Throughout proposed rules, the 12 individuals suggest replacing the word "system" with "injection well." The individuals specifically identified "systems" proposed at §§6.101, 6.102(9), 6.102(15), 6.104(a), 6.104(b), 6.105(a)(1), 6.105(a)(3), 6.105(c), 6.106(d)(3), and 6.111(b). They noted that "systems" are not currently regulated by TCEQ or TDLR, and therefore suggest the proposed term be removed.

The Commission disagrees that this recommended amendment is necessary to clarify the purpose and scope of the rules. While "system" is not used in the statute, the statute provides sufficient flexibility to use this term. The term also enables the Commission to describe all parts of shallow closed-loop geothermal systems, including the injection well and connections from the heat pump to the loop. In addition, although the statute uses "injection well," the United States Environmental Protection Agency (EPA) does not consider shallow ground source heat pump systems as injection wells under the Safe Drinking Water Act ("SDWA"). Thus, using "system" may prevent conflict with federal requirements.

Similarly, TGWA suggests replacing "geothermal" with "ground source heat pump" throughout the proposed rules to better describe the process occurring in shallow closed-loop geothermal systems. In the alternative, they suggested replacing "geothermal" with "geothermal heat injection well." TGWA makes this suggestion to mirror established industry nomenclature ("ground source heat pump borehole") and thus eliminate any confusion. However, TGWA acknowledged that the legislature defined "Shallow Closed-Loop Geothermal Injection Well" through SB 786, and thus the Commission may be limited in its ability to make changes. They encourage the Commission to continue communicating with the legislature to improve definitions to mirror established industry nomenclature, such as "ground source heat pump borehole." The 12 individuals suggested the same change, requesting that "geothermal injection well" be replaced with "ground source heat pump borehole."

The Commission disagrees with this specific change but agrees that the definition for shallow closed-loop geothermal systems proposed at §6.102(15) should be updated to better reflect the process occurring within the system. The heat pump is an integral part of the system and although the Commission is not regulating the heat pump itself, the Commission does regulate the connections

between the heat pump and the heat exchange loop. As such, §6.102(20) is adopted with a change to incorporate the term "heat pump" and "heat transfer fluids." The revised definition will also clarify that the Commission considers its term "shallow closed-loop geothermal system" to be the same as a ground source heat pump system. The Commission also adopts §6.101 with a corresponding change to relate the scope and purpose of the rules to operations regulated, which include the drilling of the borehole, completion of the well, and the construction, operation, and plugging of shallow closed-loop geothermal systems. Additionally, the Commission removes the reference to "underground sources of drinking water" from §6.101, as this is a defined term within the SDWA, and its usage is inconsistent with current TCEQ rules. The Commission amends §6.101 accordingly.

Sierra Club commented that the Commission should establish a formal permitting process, as opposed to a registration process, so nearby landowners and other stakeholders are involved in the permitting process and have an opportunity provide comments or challenge the registration.

The Commission appreciates Sierra Club's comments but declines to amend the permitting process at this time. It is the Commission's understanding that the intent of SB 786 is to transfer regulation of shallow-closed loop geothermal systems to the Commission from TCEQ without material changes to the process. The Commission also notes that these systems are relatively small and pose little environmental risk. Additionally, as discussed in more detail below, the Commission will adopt §§6.104(c)(1) and 6.106(e) with changes based on the comments to clarify that individual permitting is required for any system that deviates from the construction and operational standards in §6.106 and §6.109, including using heat transfer fluids and antifreeze additives other than potable water, food grade propylene glycol, or USP-grade propylene glycol. The changes to §6.104 discussed later in the preamble will further mitigate environmental risks. Given the low environmental risk, the Commission likens these wells to water wells, which do not require owners to notify adjacent landowners. Risk is further alleviated by revisions relating to siting requirements. In response to comments further detailed below, the Commission will adopt the language proposed in §6.109(d) with changes to require wells be located at least ten feet from adjacent property lines and sewer lines, rather than potable water sources, and move it to adopted §6.106(a). The Commission believes these two changes achieve the goal of lowering risk to adjacent property owners and other stakeholders, as well as avoid unnecessarily complicating the permitting process.

Regarding notification and participation of other stakeholders, groundwater conservation districts, TDLR, and TCEQ coordinate their actions under the existing memorandum of understanding in 16 Texas Administrative Code §76.111, relating to Memorandum of Understanding between the Texas Department of Licensing and Regulation and the Texas Commission on Environmental Quality. As previously stated,

the Commission will work with these entities to create a new memorandum of understanding, which will provide an opportunity for these stakeholders to voice concerns about the process through which these systems are authorized.

Sierra Club recommended the rules be amended to include requiring applicants of shallow closed-loop geothermal systems to: (1) pay an appropriate fee ($250 for registration, $1,000 for individual permit) to support the review of registrations and the application process; (2) require companies to have a bond, letter of credit, or other financial assurance at 50% of the expected cost to plug the well; (3) provide notice to adjacent landowners, and all landowners within one mile of the proposed well, allow for public comment and input, including an option to request the applicant file an individual permit or otherwise contest the registration; and, (4) provide notice to the groundwater conservation district, if the proposed well is located within the district's boundaries.

The Commission declines to adopt these recommendations. Regarding requiring applicants to pay a fee, the Commission lacks the statutory authority to collect registration fees from applicants, and as previously stated, it is the Commission's understanding that the legislature's intent was to transfer the program from TCEQ to the Commission without significant changes. Regarding financial assurance, it is the Commission's understanding that the vast majority of closed-loop geothermal systems in Texas use potable water as a heat transfer fluid; however, with the aforementioned changes to §6.106(e), the Commission will require individual permits for any system that uses a heat transfer fluid other than potable water, food grade propylene glycol, or USP-grade propylene glycol. As such, the Commission will analyze if any additional permit conditions are appropriate on a case-by-case basis specific to an applicant's deviation from the standards outlined in §6.106 and §6.109. Regarding adjacent and nearby landowner notice and opportunity to comment on or contest a registration, the Commission respectfully declines to adopt these changes based on the low risk of the systems and changes in siting requirements discussed previously. Regarding notice requirements to groundwater conservation districts, the new memorandum of understanding will provide an opportunity for stakeholders to express any concerns about lack of notification or participation.

Both the 12 individuals and TGWA made several comments regarding amending the definitions within §6.102, including the addition of several new definitions. The Commission appreciates all recommendations.

The 12 individuals noted that there is some confusion surrounding §6.102(5), the definition for "Individual Permit." They noted that it is also referred to as a "Request for Authorization," and requested clarification that no standalone fee is required.

The Commission understands the benefit of additional clarification regarding these terms. First, the Commission notes that the new rules do not require fees for either a Request for Authorization, or for an Individual Permit. A Request for Authorization and an Individual Permit are not the same -- an Individual Permit requirement may be triggered if the applicant's Request for Authorization or well report meet the criteria in §6.104(c)(1). A Request for Authorization is the method through which an applicant registers a shallow closed-loop geothermal system that will be authorized by rule if the Director finds that the system complies with all requirements of the rules. The Commission notes that §§6.104 and 6.105 are adopted with changes to clarify the difference between an individual permit and a request for authorization, which is revised upon adoption to be called "a registration of a shallow closed-loop geothermal system for authorization by rule."

The 12 individuals and TGWA suggested adding definitions for "annular space," "aquifer," "casing," "grouting," and "heat exchange loop." The Commission agrees and adopts §6.102 with changes to incorporate the suggested terms and definitions with a few minor changes.

The 12 individuals and TGWA provided additional language in their proposed definition of "grouting" specifying appropriate grouting materials, as well as grouting alternatives. TGWA's comment differed slightly by referring to grouting alternatives as "alternative backfill," and making it a separate definition.

The Commission declines to include this language in the definitions in §6.102 but will include the suggested language concerning grouting in §6.106(d)(2). The Commission will also include a portion of the commenters' recommended language for grouting alternatives in §6.106(d)(2) as well.

Additionally, for the definition of "Heat Exchange Loop," the 12 individuals and TGWA recommended specifying that high-density polyethylene pipe (HDPE) is required. The Commission declines to mandate a specific type of piping and instead will use "polyethylene pipe" to allow flexibility. The Commission notes that §6.106(d)(7) requires polyethylene piping to meet applicable American Society for Testing and Materials ("ASTM") standards.

Regarding §6.102(7), the 12 individuals commented that the language referring to a "pump installer" should be removed, as all pumping is performed from the surface and does not currently require a pump installer's license.

The Commission disagrees with this change. The Commission confirmed with TDLR that a license is not required when the pump is installed above ground, as most shallow closed-loop heat systems are designed. However, the Commission notes that a pump installer's license is required for submersible pumps, which may be installed. In addition, even when a licensed pump installer is not required, the system still requires an individual to install the pump. The Commission uses the term "pump

installer" to refer to the individual who installs the pump, even when a license is not required. Therefore, Commission finds the definition is still relevant.

Similarly, both the 12 individuals and TGWA recommended entirely removing definitions proposed in §6.102(11)-(13), which include the terms "pitless adapter," "point of injection," and "pump installer." The Commission agrees with removing point of injection but disagrees with removing the definitions for pitless adapter and pump installer. As mentioned above, the Commission recognizes that the majority of shallow closed-loop geothermal systems utilize a surface pump, and thus a pitless adapter and pump installer's license is unnecessary. However, the Commission declines to remove these definitions in case a submersible pump is used in the system, making the terms "pitless adapter" and "licensed pump installer" relevant. The Commission adopts §6.102 with changes to update the definition of pump installer and to add a definition for "licensed pump installer" for clarity.

The 12 individuals and TGWA recommended changing proposed §6.102(14) to define a shallow closed-loop geothermal injection well based on total well depth between 200 and 1000 feet, removing the language relating to total dissolved solids ("TDS"). Additionally, both commenters suggested rewriting "shallow closed-loop geothermal injection well" with "a heat injection borehole," or "a shallow closed-loop geothermal system."

The Commission disagrees with these revisions. The International Ground Source Heat Pump Association ("IGSHPA") defines shallow closed-loop geothermal injection wells based on TDS, not total well depth. Additionally, to maintain consistency with the statute, the Commission declines to change "shallow closed-loop geothermal injection well" to either option proposed by the individuals or TGWA.

The Sierra Club made one general comment about §6.103, expressing support for the clarification that the subchapter does not apply to open-loop air conditioning return flow wells that remain under the jurisdiction of TCEQ. Sierra Club also stated that it appreciates the distinction stating this subchapter only applies to shallow closed-loop geothermal systems used on site, not larger systems meant to generate energy for sale or transfer to energy markets. The Commission appreciates Sierra Club's comments and support.

For §6.103(a), the 12 individuals suggested expanding the scope of the subchapter to apply to systems designed or contracted for prior to January 6, 2025. They noted that this change could remedy excessive requests for authorization.

The Commission disagrees. The suggested revisions could confuse which systems these rules apply to, and the Commission would not have any information to verify dates of designs or contracts. As such, the Commission declines to adopt the requested change.

TGWA commented requesting language in §6.103(b) that would specifically exempt systems constructed prior to January 6, 2025. The suggested addition is: "Any shallow closed-loop geothermal systems in this state which were constructed before January 6, 2025 shall be grandfathered, unless altered, deteriorated, abandoned or determined by the Director to (1) encounter groundwater that is detrimental to human health and the environment or can cause pollution to land, surface water, or other groundwater; (2) cause a violation of primary drinking water regulations under 40 CFR Part 142; or (3) otherwise adversely affect human health or the environment."

Additionally, TGWA suggested adding horizontal geothermal heat pump systems, and pond/lake geothermal heat pump systems to the exceptions list under proposed §6.103(b), which is adopted as §6.103(c). The Commission supports the recommendation to exempt shallow closed-loop geothermal systems constructed prior to January 6, 2025, and adopts §6.103 with that change. The Commission also supports the addition of pond/lake geothermal heat pump systems, but not horizontal geothermal heat pump systems. As such, the Commission will add language exempting pond/lake geothermal heat pump systems only.

Under proposed §6.103(c), the 12 individuals suggest adding "licensing" in front of "requirements of TDLR regulations." The Commission agrees that this provides additional clarity to proposed subsection (c), adopted as subsection (d), and adopts this change accordingly.

The 12 individuals suggested adding introductory language to §6.104 stating that shallow closed-loop geothermal injection wells are allowable by rule, installing contractors must follow all state, local, and groundwater district rules, and that P-5 permitting is not required. They also sought to clarify that there is not a required standalone fee for registration, that a "request for authorization" is also referred to as an "individual permit," and suggested creating an "application for variance" that may be applied for through the Director.

The Commission declines to include any of the suggested language. Regarding P-5 Permitting, currently, applicants are required to have a P-5 under §91.142 of the Natural Resources Code, which requires operators conducting any activity under the Commission's jurisdiction to file a Form P-5. Regarding a standalone fee, the Commission has previously stated this is not required. The Commission agrees that additional clarity is needed in §6.104 and §6.105 regarding "request for authorization" and "individual permit," but declines to adopt the commenter's suggested amendments. The Commission has amended both sections to better describe the "authorization by rule" process and when an individual permit may be required. The Commission has added a new subsection (a) to §6.104 to better describe the operation of an "authorization by rule," which is a permit by rule process. All proposed subsections of §6.104 have been redesignated accordingly.

TWGA commented that proposed §6.104(b) needs additional clarity to accurately describe when §6.105 applies. They suggested including the language "In the event that a shallow closed-loop geothermal system will knowingly be out of compliance with this subchapter, the owner must submit to the Director a request for authorization, as required by §6.105 of this title."

The Commission agrees that additional clarity is needed but does not agree to add the specific language TWGA suggested. Sections 6.104(b) and 6.105 are connected as stated in proposed §6.104(b). The Commission notes that due to changes based on comments, proposed §6.104(b) is adopted as §6.104(c). These changes are discussed further in the following paragraphs.

Section 6.104 authorizes shallow closed-loop geothermal systems that comply with the requirements of the subchapter. The systems are authorized, and the system owner is not required to apply for and obtain an individual permit unless the Director finds that the system meets any of the conditions listed in proposed §6.104(b) (adopted §6.104(c)). Though the systems are eligible to be authorized by rule (i.e., permitted by rule) a registration and well report must be provided so the Commission can determine whether the system is consistent with the rules or if any other conditions listed in §6.104(c) are present. In proposed §6.104 and §6.105, the Commission called the registration the "request for authorization." To reduce confusion, the Commission revises that term and now refers to a "registration" in adopted §6.104 to mirror the changes in adopted §6.105, detailed below. To provide additional clarity regarding when an individual permit may be required, the Commission adds a condition in §6.104(c)(1)(C) denoting that deviation from any construction or operational standard described in the rules is cause for the Director to require an individual permit. For example, if a system utilizes any heat transfer fluid other than potable water and the approved additives listed in §6.106, an individual permit may be required. As previously stated, neither a registration of a shallow closed-loop geothermal system for authorization by rule nor an individual permit requires payment of a standalone fee at this time.

Section 6.105 specifies the process for registering the authorized system with the Commission. The registration is required even when the system is authorized under §6.104. As discussed in the preceding paragraph, the Commission will replace "request for authorization" with "registration" each time it appears in §6.104 and §6.105. Additionally, the Commission amends the title of §6.105 to "Registration of a Shallow Closed-Loop Geothermal System for Authorization by Rule" to clarify that authorization by rule still requires registration. This update keeps the language in both rules consistent to provide clarity regarding the purpose of each section.

Under §6.105(a), both the 12 individuals and TGWA recommended removing language referring to a pump installer in subsection (a)(1). TGWA also requested removing subsection (a)(3) in its entirety.

As discussed above, a licensed pump installer is still required for the installation of a submersible pump. Therefore, the Commission adopts a change in §6.105(a)(3) to clarify that the requirement only applies when a submersible pump is installed. Additionally, under §6.105(a)(2), TGWA suggested adding "heat" between geothermal and injection wells. As previously stated, the Commission declines to adopt this change to be consistent with the relevant statutes.

Regarding §6.105(b), the 12 individuals and TGWA suggested replacing "water quality section" with "comment section" in reference to the Well Report Form.

The Commission agrees to remove "water quality section," but does not agree to include "comment section." With this revision, the Commission is requiring that any additive, constituent, or fluids other than potable water be reported on the Well Report Form but does not specify where that information must be reported. Thus, the Commission is providing flexibility within the rules for changes to the structure of the Well Report form.

Sierra Club expressed support for all the provisions of §6.106, noting that if the standards of §6.106 are followed, it will assure that these systems do not provide pathways for pollution or fluid migration. Sierra Club also specifically noted its support for the penalty language. The Commission appreciates Sierra Club's comment and support of §6.106.

The 12 individuals and TGWA suggested several revisions to §6.106. Regarding proposed subsection (a), both commenters suggested removing the entire subsection, stating that the completion of shallow closed-loop geothermal heat injection wells is below the surface and not meant to be accessed upon completion.

The Commission disagrees. The requirements of proposed subsection (a) are necessary to ensure that all piping is protected, and that water drains away from the well.

The 12 individuals and TGWA made several suggestions to proposed §6.106(b). Regarding proposed subsections (b)(1) and (b)(2), they suggested replacing "impervious bentonite" with "grouting." Additionally, both suggested replacing "sand, gravel, or drill cuttings" in proposed subsection (b)(2) with "alternative grouting."

The Commission generally agrees with these comments but declines to adopt the suggested language concerning grouting alternatives in full. As stated in response to comments on the definitions proposed in §6.102, the Commission will define grouting in accordance with the commenters' recommendations in §6.106(b)(1), adopted as subsection (d)(2), instead of in the definitions section. The Commission will include "solid bentonite chip," as an approved grouting alternative, and require all other materials to be approved by the Director. This is in accordance with IGSHPA standards and ensures that only materials which meet or exceed good engineering practices to create an impervious seal are used as

grouting and grouting alternatives. The amendments state approved grouting materials consist of a combination of bentonite, cement, thermally enhanced material, or a combination of such materials. In instances where boreholes will not support a grouting slurry, grouting alternatives, such as solid bentonite chip material may be used. Proposed subsection (b)(2), adopted as subsection (d)(3), requires that where no groundwater or only one zone of groundwater is encountered during drilling, alternative grouting may be used to backfill up to 30 feet from the surface. The water well driller shall fill the top 30 feet of the annular space with grouting, or alternative grouting that has been approved by the Director.

The 12 individuals and TGWA also suggested amending proposed §6.106(b)(4), adopted as subsection (d)(5), to include a requirement that the borehole be no smaller than 4 inches, and large enough to freely install the loop, tremie line and grouting material.

The Commission declines to include this amendment because the proposed language is identical to international standards published by IGSHPA.

For proposed §6.106(b)(5) and (6), both the 12 individuals and TGWA suggested replacing "tubing" with "heat exchange loop," as defined by §6.102. Additionally, they recommended including a reference to ASTM D3035, which they noted is the appropriate standard of HDPE tubing in §6.106(b)(6). Similarly, under §6.106(b)(8), the 12 individuals suggested replacing "plastic loop" with HDPE tubing, and asked that alternate backfill sand materials be allowed with approval by the Director. TGWA recommended deleting paragraph (8) in its entirety.

The Commission agrees to replace "tubing" with "heat exchange loop" under proposed §6.105(b)(5) and (6), adopted as subsection (d)(6) and (7), but declines to include a reference to HDPE and ASTM D3035. The Commission also disagrees with deleting proposed paragraph (8) in its entirety or amending it to reference HDPE. As stated in response to comments regarding the definition of heat exchange loop under §6.102, the Commission chooses to retain flexibility for operators to use polyethylene piping material in accordance with ASTM standards, and thus declines to specify the type of polyethylene piping required.

Regarding proposed §6.106(b)(7), the 12 individuals and TGWA suggested the Commission include a requirement that any fused joints intended to be placed in the borehole are required to be constructed at the loop manufacturer facility. They also recommended deleting the last sentence referencing electrofusion joints and non-metallic mechanical stab type insert fittings, noting that they are not allowed by design teams or trade organizations to be used in a borehole. The Commission declines to adopt these two changes and will keep the proposed language as written. Similar to other portions of the rules, the Commission seeks to allow flexibility under proposed §6.106(b)(7), adopted as subsection (d)(8).

For proposed §6.106(b)(9) and (10), which discuss copper piping, the 12 individuals and TGWA recommended removing both subsections. They commented that copper piping is not typically used in Texas, is susceptible to corrosion, and should require an individual permit.

The Commission does not agree to remove proposed subsection (b)(9), adopted as subsection (d)(10), because even though copper piping may not be common, if it is used, copper piping should meet certain standards. Further, proposed subsection (b)(9), now subsection (d)(10), contemplates that other piping may be used. It states, "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." The Commission agrees to remove proposed subsection (b)(10), based on the comments stating that most systems utilize PE piping. The Commission adopts §6.106 with those changes.

The 12 individuals and TGWA suggested wholesale changes to proposed §6.106(c), including deleting paragraphs (1)-(3), removing "into bedrock" from paragraph (4), and editing paragraph (5) to state that temporary casing may be installed, not that it must be installed.

The Commission agrees to revise proposed §6.106(c), which is adopted as §6.106(d), but does not agree to remove all of paragraphs (1) - (3). Additionally, because casing is part of completion and drilling requirements, the requirements of proposed subsection (c) will be contained within subsection (d) "drilling and completion requirements," which was proposed as subsection (c). Casing requirements are renumbered as paragraph (1) under drilling and completion requirements. To provide clarity that casing is not required for all shallow closed-loop geothermal systems but may be necessary to ensure borehole integrity, the Commission will move the language in proposed subsection (c)(5) to adopted §6.106(d)(1). The casing requirements proposed in subsection (c)(1)-(3) will be adopted in §6.106(d)(1)(A)-(C) and will apply if temporary casing is used.

The 12 individuals and TGWA also recommended significant revisions to proposed §6.106(d), which is adopted as §6.106(e). First, they recommended retitling the subsection to "Heat Transfer Fluids," instead of just "Fluids." The Commission agrees with this recommendation and adopts the subsection with the requested change.

Additionally, both commenters suggested adding potable water and food grade propylene glycol to the list of approved heat transfer fluids, and suggested the Commission remove ethanol. If ethanol is removed from the list of approved heat transfer fluids, both the 12 individuals and TGWA stated that subsections (2) and (3) can be deleted.

The Commission agrees with adding potable water, and food grade propylene glycol, removing ethanol, and deleting subsections (2) and (3). The Commission will also include USP-grade propylene glycol in the list of approved heat transfer fluids.

The 12 individuals and TGWA also suggested including language that would allow alternative fluids to be used after approval from the Director. The Commission declines to include this statement. Any deviation from the approved heat transfer fluids would require an individual permit. If changes in technology occur and it becomes necessary to incorporate additional fluid types, the Commission can consider rule revisions at that time.

Additionally, the Commission moves some provisions from §6.109 to §6.106 for clarity, including the standards for siting and setback, and prohibiting commingling. Both of these standards were proposed under §6.109, Operational Standards, but are best described as Construction Standards. The Commission has reorganized the subsections of §6.106 and §6.109 to reflect these changes. Comments regarding siting and setback, and commingling are addressed later in the paragraphs containing the Commission's responses to proposed §6.109.

The 12 individuals and TGWA both suggested deleting all of §6.107 due to the updates they provided for proposed §6.106(d), adopted as §6.106(e), relating to heat transfer fluids. They commented that if §6.106 is updated to only include non-toxic, non-hazardous, food grade heat transfer fluids, then §6.107 becomes unnecessary.

The Commission agrees §6.107 can be removed, as §6.106(e) has been amended to only include potable water, food grade propylene glycol, or USP-grade propylene glycol as approved heat transfer fluids. As such, the approved heat transfer fluids are non-toxic, non-hazardous, food-grade fluids. Any deviation from non-toxic, non-hazardous, food-grade heat transfer fluids would require the applicant to obtain an individual permit. The requirements proposed in §6.107 could be added to an individual permit if necessary, but are not needed when non-toxic, non-hazardous, food-grade heat transfer fluids are used. Section 6.107 will be withdrawn and not adopted.

The 12 individuals and TGWA suggested deleting §6.108 in its entirety due to its references to pump installers.

The Commission disagrees. As previously stated, the Commission adopts the rules with changes to clarify that a pump installer and a licensed pump installer are different. A pump installer is simply the person who installs a pump. For above-ground pumps, this person is not required to be a TDLR licensed pump installer. A licensed pump installer is required to install the pump when the system utilizes a submersible pump. Thus, the Commission will not remove §6.108, as it is not specific to a "licensed pump installer."

The 12 individuals recommended deleting §6.109(a)(1)-(3). They stated that since no part of the shallow closed-loop geothermal injection well is accessible or visible from the surface on the exterior of a building or residence, displaying the information required under paragraphs (1)-(3) would be overly burdensome and restrict the owner from protections provided by Texas Occupations Code §1901.251. The commenters also stated that proposed subsection (a)(2) could limit an owner's ability to hire a service or maintenance provider that is not listed on the system.

The Commission understands these concerns. Rather than deleting this section, the Commission adopts it with a change to merely require signage that identifies the geothermal system. The Commission agrees that the requirement to include the name and number of a person to contact in case of a shutdown or for routine maintenance could lead to confusion.

The 12 individuals and TGWA suggested adding "air" to §6.109(b) as a viable option for pressure testing.

The Commission disagrees. These systems shall be tested with matter in the same state intended to be used in operation. As such, only water may be used for pressure tests.

The 12 individuals recommended removing §6.109(c). They stated that because there is no physical injection or extraction occurring through the borehole, sampling is unnecessary.

The Commission agrees and adopts §6.109 with the requested revision. If a system uses a heat transfer fluid other than water, food-grade or USP-grade propylene glycol, the Commission may include sampling requirements in an individual permit.

The 12 individuals and TGWA recommended removing and replacing "potable water sources" with "adjacent property lines" in proposed §6.109(d), adopted as subsection (c).

The Commission agrees to this amendment. As stated in the comments, this change is consistent with 16 Texas Administrative Code, Chapter 76. This subsection is moved and adopted under §6.106(a), as discussed above.

Regarding proposed §6.109(e), the 12 individuals and TGWA recommended removing "through the casing annulus or the gravel pack."

The Commission agrees because the remaining language is sufficient to address the Commission's concerns regarding commingling. This subsection is moved and adopted under §6.106(c), as noted above. Adopted §6.109 is renumbered to reflect the movement of these two subsections to §6.106.

Regarding §6.110, the 12 individuals and TGWA stated that it was their understanding that a well report was not needed for each well when multiple boreholes are drilled as part of the same system. They

suggested that to avoid confusion, a map or schematic should be required. Both TGWA and the 12 individuals suggested edits to §6.110(a) to provide clarity regarding the need for one well report only.

The Commission agrees that a well report is not needed for each well. The Commission adopts §6.110 with the language TGWA provided, adding a final sentence to subsection (a) stating, a "well report is not needed for each well constructed on one site, however a map or drawing of each well must be provided." Additionally, the Commission adopts §6.110(b) with changes to the well report list to illustrate that multiple wells may be included under one well report. For example, "well or wells," and "owner of the well or wells," are used instead of "well" and "owner of the well."

To further provide clarity, the Commission will combine §6.110(b)(8)-(10) and state that a "schematic showing the borehole diameter in inches, the bottom depth in feet, and the drilling method" is required with the Well Report. The Commission adopts the remaining paragraphs with corrected paragraph numbers.

Additionally, regarding §6.110(b), the 12 individuals and TGWA suggested adding an additional subsection stating that any additives, constituents, or fluids used to make up the heat transfer fluid, must be on the well report. The Commission agrees and will add this requirement in adopted §6.110(b).

In §6.110(d), the 12 individuals and TGWA recommended removing the requirement for an owner to transfer a well, and instead treating a shallow closed-loop geothermal system more like a water well, which transfers with the property at the time of conveyance. The Commission agrees, and will include the language provided by TGWA, which states a "shallow closed-loop geothermal system, once drilled, installed, and operating, is a permeant fixture of the property. If the property is transferred, both the transferor owner and transferee owner shall notify the Commission of the transfer within 30 days of the date of the transfer."

The 12 individuals and TGWA suggested several edits to §6.111. Both parties suggested replacing subsection (a)(1) and (2) with language requiring the owner to engage in alternative plugging activities such as removing all heat transfer fluid from the closed loop system and taking necessary precautions to ensure groundwater protection; excavating to the top of the borehole and cutting off the heat exchange loop at least three feet below the surface; and filling the upper one foot of the borehole with grout and the remaining hole with compacted earth.

The Commission declines to adopt this language. The proposed language is consistent with the requirements in place prior to the legislature's transfer of authority from TCEQ to the Commission. The proposed language also allows for greater flexibility, while still maintaining appropriate plugging standards.

Regarding §6.111(c), the 12 individuals and TGWA suggested removing the requirement for a signed statement that the well was plugged in accordance with §6.111, and replacing it with a requirement that a driller or well owner who plugs an abandoned well shall submit to the Commission a completed copy of their well plugging report filed with the Texas Department of Licensing and Regulation electronically through the Texas Well Report Submission and Retrieval System. They noted that this will allow licensed drillers to fulfill the licensing requirements of the TDLR. The Commission agrees with this change and adopts §6.111(c) with changes to incorporate it.

That concludes the summary of comments received on the proposed new rules. The Commission appreciates the input provided by stakeholders. The remaining paragraphs summarize the requirements of the adopted rules.

As stated in §6.101, the new rules in Subchapter A of Chapter 6 specifically address shallow closed-loop geothermal injection wells, which are defined in §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 ensures consistency with definitions developed by the Texas Groundwater Protection Committee. Section 6.101 is adopted with changes due to the comments.

Section 6.102 contains definitions for terms used throughout the subchapter such as fresh water, injection well, license number, pump installer, water well driller, and well report. Section 6.102 is adopted with changes due to the comments.

Section 6.103 clarifies that the subchapter only applies to shallow closed-loop geothermal systems for which construction is commenced after the effective date of Subchapter A. The section is adopted with changes due to comments but the proposed effective date of January 6, 2025, is unchanged.

Section 6.103 also clarifies types of shallow-closed loop geothermal systems to which the subchapter does not apply. Section 6.103 is adopted with changes due to the comments.

Section 6.104 specifies that 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 (i.e., permitted by rule) provided it is drilled, installed, and operated in accordance with Subchapter A. Section 6.104 states this general rule and provides for exceptions based on the Director's review. Section 6.104 is adopted with changes due to the comments.

Section 6.105 describes the procedure for registering a shallow closed-loop geothermal system. The section is adopted with changes due to comments.

Section 6.106 contains the construction standards with which the licensed water well driller must comply when drilling a shallow closed-loop geothermal injection well. Subsection (a) contains the siting and setback requirements. Subsection (b) contains the surface completion requirements, including the requirement to place a concrete slab or sealing block above the cement slurry around the well. Subsection (b) also provides requirements for the concrete slab or sealing block. Subsection (c) prohibits commingling, requiring shallow closed-loop geothermal systems to be completed in a manner that prevents waters that differ significantly from mixing. Subsection (d) contains the drilling and completion requirements for the licensed water well driller. Requirements for grouting material are included but the water well driller is also authorized to request the Director's approval for using a grouting alternative that is similarly impervious if the borehole will not support a traditional grouting slurry.

Although casing is not required in every system, temporary casing may be required to ensure borehole integrity. Casing for shallow closed-loop geothermal injection wells is addressed in subsection (d) of §6.106, in paragraph (1). Subsection (e) of §6.106 outlines the fluids that may be used as antifreeze additives. Only potable water, food grade propylene glycol, and USP-grade propylene glycol may be used as antifreeze additives for a shallow closed-loop geothermal injection well. To use any other additive, the system requires an individual permit.

Section 6.108 contains the requirements for the individual that installs the pump on the shallow closed-loop geothermal system.

Standards for operating the shallow closed-loop geothermal system are adopted in §6.109. Requirements for safety, pressure testing, and conformance with local regulations are found in subsections (a), (b) and (c). Proposed subsection (c) is removed and the remaining subsections redesignated. Proposed subsection (d) and proposed subsection (e) are moved and adopted under §6.106 as subsections (a) and (c), respectively. Adopted §6.109 (c), proposed as subsection (f), notes that site plans may be required by local jurisdictions.

Section 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. This information is consistent with the information currently required on the report under §76.70. Section 6.109 also 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. Section 6.110 is adopted with changes to specify that a shallow closed-loop geothermal system is a fixture on real property. As such, ownership of a shallow closed-loop geothermal injection well transfers with the property.

Section 6.111 outlines plugging requirements for shallow closed-loop geothermal injection wells upon permanent discontinued use or abandonment. Subsections (a) and (b) contain the technical requirements for plugging, and subsection (c) requires the person who plugs the well to submit to the Commission a completed copy of the well plugging report filed with the Texas Department of Licensing Regulation through the Texas Well Report Submission Retrieval System, 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.

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

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

§6.102. Definitions.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(20) Shallow closed-loop geothermal system--A closed-loop geothermal injection well, including all **heat** pumps and tubing, **heat transfer fluids,** and connections from the injection well to the infrastructure and the geothermal heat exchange system, that operates as a heat source or heat sink in concert with a heating, ventilation, and air conditioning system designed to heat or cool infrastructure. **These systems are also called "ground source heat pump systems."** All energy used from this type of **system** is consumed by the onsite infrastructure and is not provided to an energy market.

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

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

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

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

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

§6.103. Applicability and Compliance.

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

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

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

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

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

(c) This subchapter does not apply to:

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

(2) other geothermal injection wells; **or**

(3) pond/lake geothermal heat pump systems.

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

§6.104. Authorization by Rule.

(a) **An authorization by rule (or "permit by rule") provides authority to operate under predetermined requirements without a separate application process, so long as the Director confirms the activity meets the specified predetermined requirements.**

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

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

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

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

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

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

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

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

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

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

(C) refer the violation for enforcement action.

(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. **Registration of** ~~Authorization for~~ a Shallow Closed-Loop Geothermal System **for Authorization by Rule**.

(a) **Registration** for authorization **by rule**.

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

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

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

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

(c) Approval. **A registration submitted under this section** will be reviewed by the Commission's Special Injection Permits (SIP) Unit. The SIP Unit will notify the owner when the TDLR

state well report form is approved by the Commission. The owner may operate the system as soon as the owner receives the SIP Unit's approval.

§6.106. Construction Standards.

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

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

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

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

(3) A pitless adapter may be used if:

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

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

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

(d) Drilling and completion requirements.

(1) Casing. Temporary casing **may** be installed to prevent overburden cave-in prior to the installation of tubing material and grouting of shallow closed-loop geothermal injection wells ~~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. If temporary casing is installed, it shall comply with the following requirements:

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

(B) Plastic well casing or screen shall not be driven. Plastic well casing shall meet the requirements specified in the ASTM Standard F480, Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR) as amended and

supplemented. Plastic casing shall also meet the American National Standards Institute (ANSI) standards for "Plastic Piping System Components and Related Materials."

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

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

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

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

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

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

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

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

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

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

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

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

(**e**) **Heat Transfer** Fluid**s**.

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

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

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

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

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

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

§6.108. Pump Installer Requirements.

The pump installer shall:

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

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

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

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

§6.109. Operational Standards.

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

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

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

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

~~(e) Commingling prohibited. All shallow closed-loop geothermal 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.~~

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

§6.110. Well Reports.

(a) The water well driller is required by §76.70 of this title (relating to Responsibilities of the Licensee -- State Well Reports) to submit a well report to TDLR electronically through the Texas Well Report Submission and Retrieval System (TWRSRS). The driller shall provide an electronic copy of the

well report to the Director within 30 days of well completion ~~for each well drilled~~. **A well report is not required for each well constructed on one site; however a map or drawing of each well shall be provided.**

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

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

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

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

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

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

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

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

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

~~(9) the bottom depth in feet;~~

~~(10) the drilling method~~;

(9) the driller's name;

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

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

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

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

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

§6.111. Plugging.

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

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

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

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

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

§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.

This agency hereby certifies that the rules as adopted have been reviewed by legal counsel and found to be a valid exercise of the agency's legal authority.

Issued in Austin, Texas, on 12/17/2024, 2024.

Filed with the Office of the Secretary of State on 12/17/2024, 2024.

DocuSigned by:
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