DEPARTMENT OF NATURAL RESOURCES

Division of Water Resources

RULES AND REGULATIONS FOR PERMITTING THE DEVELOPMENT AND THE APPROPRIATION OF GEOTHERMAL RESOURCES THROUGH THE USE OF WELLS

2 CCR 402-10

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

Rule 1 Title

The title of these rules and regulations is "Rules and Regulations for Permitting the Development and Appropriation of Geothermal Resources through the Use of Wells". The short title for these rules and regulations is "Geothermal Rules". They may be referred to herein collectively as the "Rules" and individually as a "Rule". Geoexchange systems, commonly constructed by drilling boreholes for the installation of pipe loops, also utilize the earth's geothermal properties. The loop fields for geoexchange systems do not appropriate subsurface fluids, but are referred to as "geothermal wells" or "wells" in these Rules.

Rule 2 Authority

These Rules are promulgated pursuant to the authority granted the State Engineer in Sections 37 80 102(1)(g) and (k), 37 90 138, and 37 90.5 106, 107 and 108, C.R.S. (2003).

Rule 3 Scope And Purpose

3.1 All geothermal resources of the State of Colorado shall be administered by the State Engineer. The State Engineer recognizes that these resources are developed for their thermal attributes and that management of geothermal resources is necessary to maximize beneficial use and prevent waste of these resources. The Rules promulgated herein are required to enable the State Engineer to carry out the provisions of the Colorado Geothermal Resources Act, Sections 37 90.5 101 et seq, C.R.S. (2003).

3.2 Geothermal resources are most often developed through the construction of wells and boreholes. These Rules apply to the permitting and construction of geothermal wells and for the assessment of application fees pursuant to Section 37 90.5 106, C.R.S. (2003), and these Rules. Their purpose is to make the submission, consideration and evaluation of permit applications more uniform and certain. The granting of permits also provides the State Engineer the means to monitor and record the development and uses of geothermal resources.

3.3 These Rules establish minimum standards for the construction, testing, operation, and plugging of geothermal wells, and the reinjection of geothermal fluids in order to protect the public health, safety and welfare, and to prevent the contamination of the environment and the waste of geothermal resources.

3.4 Pursuant to Section 37 90.5 107, C.R.S. (2003), the appropriation of geothermal fluids to recover geothermal resources is recognized as a beneficial use of ground water. These Rules provide for the submission and evaluation of permit applications to construct geothermal wells and appropriate geothermal fluids from wells in order to prevent injury to valid, prior water or geothermal rights. These Rules also provide for the recording of existing wells used for the extraction of geothermal resources.

3.5 These Rules define the State Engineer's authority to monitor and observe the use of geothermal resources and to require the installation of measuring devices to prevent injury to valid, prior water or geothermal rights and waste of the resource, and to provide the means for enforcing these Rules.

3.6 These Rules establish procedures for the formation of geothermal management districts as provided for in Section 37 90.5 108, C.R.S. (2003), and for the setting of standards for controlling well spacing, production rates and requiring reinjection of produced fluids in such districts.

3.7 These Rules do not apply to the diversion of waters from natural surface streams, or naturally flowing springs, or to the discharge (as defined in Rule 4.2.11) of geothermal fluids.

3.8 These Rules do not apply to water wells permitted pursuant to Articles 90 and 92 of Title 37, C.R.S. (2003), or to those wells subject to the jurisdiction of the Oil and Gas Conservation Commission, or to those wells subject to the jurisdiction of the Mined Land Reclamation Board.

Rule 4 Definitions

4.1 **Statutory Definitions** - The terms listed below are defined by statute and have the identical meaning as in the referenced statutes:

4.1.1 Colorado Geothermal Resources Act, Section 37 90.5 103, C.R.S. (2003): Geothermal By Products, Geothermal Fluid, Geothermal Resource, Hot Dry Rock, and Material Medium.

4.1.2 Section 37 91 102, C.R.S. (2003): Board, Ground Water, Installation of Pumping Equipment, Person, Repair, Well Construction Contractor, and Well Seal.

4.1.3 Colorado Ground Water Management Act, Section 37 90 103, C.R.S. (2003): Nontributary Ground Water, and Waste.

4.2 **Specific Definitions** - Unless expressly stated otherwise, the following terms shall have the meaning indicated in this Rule.

4.2.1 " **Aquifer** " means a hydrogeologic unit consisting of an interval, or hydraulically connected intervals, of consolidated and/or unconsolidated rock material that is capable of storing and transmitting water. It includes both the saturated and unsaturated zone but does not include the confining layer that separates aquifers.

4.2.2 " **Borehole** " means any excavation that is augered, drilled, bored, cored, washed, fractured, driven, dug, jetted, or otherwise constructed to access the subsurface for the purpose of constructing a hole or well under the jurisdiction of these Rules.

4.2.3 " **Casing** " means the pipe installed to prevent collapse of and provide access to the borehole. The term includes both nonperforated ("solid") pipe, perforated pipe, and screen.

4.2.4 " **Certified Individual** " means an individual who is certified by the State Engineer to perform/supervise the drilling or grouting in the construction of loop fields in vertical closed-loop geoexchange systems, or to perform/supervise the excavation and backfilling of loop fields in horizontal closed-loop geoexchange systems or submerge loop fields in a body of water.

4.2.5 " **Completed Loop Field** " means that closed-loop piping has been installed in a borehole, trench or other excavation, or submerged in a body of water; grout has been placed as

required by these Rules; and the integrity of the loop field has been tested as required in Rule 8.6.

4.2.6 " **Completed Well** " means a well that has been drilled to its total depth, has been cased, grouted, and pressure or flow tested as required, has been equipped with production equipment if needed, and is ready to be placed into service.

4.2.7 " **Confining Layer** " means a geologic zone that, because of its impermeability or low permeability, inhibits the flow of ground water to or from an adjacent aquifer.

4.2.8 " **Contaminant** " means any chemical or organic material, live organisms, radioactive material or heated or cooled water that will adversely affect the quality of surface or ground water.

4.2.9 " **Contamination** " means the introduction of contaminants into surface or ground water.

4.2.10 " **Designated Agent** " when used herein shall mean the representative of an owner of a geothermal well who has been authorized in writing by the owner to act in his behalf.

4.2.11 " **Discharge** " means the disposal of geothermal fluids after use by a geothermal well owner or operator.

4.2.12 " **Field or Geothermal Field** " means the general area that is, or appears to be, underlain by a geothermal resource, including hot dry rock. The terms "field" and "reservoir" have the same meaning if only one reservoir is involved; however, "field", unlike "reservoir", may relate to two or more reservoirs.

4.2.13 " **Flow Test** " means the testing of a geothermal well to determine the geologic and hydrologic parameters of the reservoir, the physical and chemical properties of the geothermal fluids, or the production or reinjection rates for a well.

4.2.14 " **Geoexchange System** " means a heat pump or heat exchange system having a horizontal or vertical closed-loop portion consisting of pipe buried in trenches, boreholes, or wells (ground-source), or submerged in a body of water (water-source), in which a heat exchange medium (fluid or vapor) is circulated and fully contained within the pipe or tubing. The purpose of the closed loop is to provide for the transfer of heat between the circulating fluid or vapor and the ground or water.

4.2.15 " **Geothermal Well** " means a well that is constructed for the purpose of exploration, use of a geothermal resource, or reinjection of a geothermal fluid. The term "Geothermal Well" does include loop fields, but does not include a well subject to the provisions of Articles 90 and 92 of Title 37, C.R.S. (2003), wells subject to the jurisdiction of the Oil and Gas Conservation Commission pursuant to Article 60 of Title 34, C.R.S. (2003), or wells subject to the jurisdiction of the Mined Land Reclamation Board pursuant to Articles 32 and 33 of Title 34, C.R.S. (2003).

4.2.16 " **Grout** " means any material approved by these Rules that is used to form a permanent impermeable seal in the annulus between the closed loop or casing and the borehole wall, between two strings of casing, or that is used in plugging, boreholes, loops or wells.

4.2.17 " **Grouting** " means the process by which grout is placed in the borehole or casing.

4.2.18 " **Loop Field** " means any excavation or borehole constructed for the installation of piping to contain a fluid or vapor for circulation in the operation of a closed-loop geoexchange system.

4.2.19 " **Mechanical Integrity Test** " means a procedure to determine if the casing, tubing, or packers leak or if fluid movement occurs in or adjacent to the well other than in the reservoir.

4.2.20 " **Open System** " means a system that generally consists of a production well (Type A-OS) to withdraw a geothermal fluid, and a reinjection well for returning the fluid to the aquifer.

4.2.21 " **Operator** " means the person maintaining or operating a geothermal well, whether or not such person is the owner of the well, and where such person has been designated in writing by the well owner to act on his behalf.

4.2.22 " **Plugged Well** " means a well that has been plugged to prevent entry of fluids into the well and to isolate subsurface fluids to the formations in which they are encountered in the well.

4.2.23 " **Production Equipment** " means any pump, fluid circulating system, or other device used or intended for extracting geothermal resources from a well. Production equipment includes well seals, well heads, control devices, and couplings appurtenant thereto.

4.2.24 " **Reinjection** " means reintroducing geothermal fluids through a well into the same reservoir from which they were produced, whether by pressure at the surface or by gravity flow.

4.2.25 " **Replacement Geothermal Well** " means a new well constructed to replace an existing geothermal well, or any portion thereof. The repair of an existing geothermal well is excluded from this definition, where such repair does not relocate or expand the structure.

4.2.26 " **Reservoir** " means a subsurface geologic unit or aquifer that contains a common geothermal source. Each reservoir in a field, which is hydrologically separated from any other reservoir, is covered by the term "reservoir" in these Rules.

4.2.27 " **Special Field Rules** " shall mean those rules promulgated for and which are limited in their application to geothermal management districts.

4.2.28 " **Type A Geothermal Well** " means any geothermal well that has a total depth not exceeding two thousand five hundred (2,500) feet or that encounters geothermal fluids having a temperature not exceeding two hundred and twelve (212) degrees Fahrenheit.

4.2.28.1 " **Type A-OS Well** " means the production well component of an open system to withdraw a geothermal fluid that is utilized for its geothermal properties.

4.2.28.2 " **Type A-CLH Well** " means loop fields in a horizontal closed-loop geoexchange system that consists of pipe or tubing installed in horizontal trenches (ground-source) or submerged in a body of water (water-source).

4.2.28.3 " **Type A-CLV Well** " means loop fields in a vertical closed-loop geoexchange system that consists of pipe or tubing installed in drilled boreholes or wells.

4.2.29 " **Type B Geothermal Well** " means any geothermal well that has a total depth greater than two thousand five hundred (2,500) feet or that expects to encounter geothermal fluids having a temperature greater than two hundred and twelve (212) degrees Fahrenheit.

4.2.30 " **Well Construction Operations** " means any act undertaken at the well site for the establishment or modification of a geothermal well, including the installation and cementing of casing and the installation of production and well head equipment. Well construction operations do not include surveying actions and site preparations prior to installing construction equipment.

4.2.31 " **Well Owner** " means any person who holds the title or other property rights in or to a geothermal well.

4.3 **Other Definitions** - All other words used herein shall be given their usual customary and accepted meanings. All words of a technical nature specific to the well drilling industry shall be given the meaning that is generally accepted in that industry.

4.4 **Gender** - Words used in the present tense include other tenses; words used in the masculine gender include the feminine and neuter genders.

Rule 5 General Rules

5.1 **Protection of Life, Health, and the Environment** - All geothermal exploration, well construction, flow testing, production and reinjection shall be conducted in a manner that will:

a. afford reasonable protection for human life and health and for the environment;

b. contain underground fluids to the reservoirs in which they occur with the exception of the producing reservoir; and,

c. prevent the waste of the geothermal resource.

5.2 **Knowledge of Rules** - It shall be the responsibility of all geothermal well owners, operators and constructors to obtain information pertaining to the regulation of geothermal resources before beginning construction operations. These Rules provide minimum standards for the construction and operation of geothermal wells and they do not preclude the use of higher standards or better grade materials. The owner, operator and constructor shall be responsible for knowing and complying with applicable federal, state, and local statutes, rules and codes.

5.3 **Entry Upon Property** - The State Engineer and his duly authorized representatives have the authority and duty to enter upon, and to order the well owner or operator to permit the entry upon, private property at any reasonable time to inspect the various means or proposed means of appropriation, transportation, reinjection, and extraction; to observe well construction and plugging and the uses or proposed uses of the geothermal resource; and to read meters, gauges, and other measuring devices.

5.4 **Training and Safety Equipment** - When hazardous conditions or contaminants are known or suspected to be encountered during well construction, personnel shall be adequately trained and proper safety equipment provided to handle and contain the hazard.

5.5 **Vertical Boreholes** - Unless directional drilling has been specifically approved by the State Engineer, all boreholes shall be constructed so that the horizontal deviation of the borehole from its surface location is a practical minimum at all times. The sidetracking of the borehole due to adverse drilling conditions shall not be considered as directional drilling as long as the borehole does not deviate more than two hundred (200) feet from the permitted surface location and meets the spacing constraints of these Rules.

5.6 **Directional Drilling** - Notice shall be given to and approval obtained from the State Engineer prior to any directional drilling operations intended to deflect the borehole horizontally from the surface

location of the well or borehole. The notice shall clearly state the exact surface location of the well or borehole, the proposed depth, the proposed direction of deflection, and the proposed course of the deviated borehole. Within sixty (60) days after constructing the well or borehole, the owner or operator shall submit to the State Engineer an accurate and complete directional survey.

5.7 **Multiple Completion of a Well** - The construction of a geothermal well for the simultaneous extraction of geothermal resources from more than one reservoir shall not be approved by the State Engineer unless the following conditions are met:

a. an application is submitted to the State Engineer setting forth all material facts involved and the proposed manner and method of construction. The application shall include a diagram of the mechanical installations showing how the resource will be extracted separately from each reservoir and the appropriations measured;

b. prior to submitting an application, the applicant shall give notice of the proposed multiple completion to the owners or operators of any valid, prior water or geothermal rights that are located within one half (½) mile of the proposed well. The notice shall be sent by certified mail, return receipt requested, and shall include a copy of the permit application. The notice shall instruct the owners or operators that they must submit a written objection to the State Engineer within forty-five (45) days of their receipt of the notice if they are opposed to the proposed multiple completion. Evidence that this notice was given shall be submitted with the permit application; and,

c. if no objection to the multiple completion is filed within forty-five (45) days and if the State Engineer finds that the production from each reservoir can be identified and measured and that circumstances in a particular instance so warrant, he shall issue the permit. If an objection is filed, the State Engineer shall hold a hearing to determine whether circumstances in the particular instance warrant issuing a permit.

5.8 **Unattended Open Wells** - All geothermal wells, when unattended during construction or repair, shall be securely capped, covered or sealed to prevent objects or fluids from entering the well.

5.9 **Well Identification** - All Type B geothermal wells constructed pursuant to these Rules shall be marked by the owner in a conspicuous place with the owner's or operator's name, name of lease (if applicable), permit number of the well, name of the reservoir, the well designation given by the owner (if used), and legal description of the well. The owner shall take all necessary means and precautions to preserve and maintain these markings. A permanent sign shall be installed within sixty (60) days after the completion of the well.

5.10 **Installation of Measuring Devices** - The State Engineer and his authorized representatives have the authority to order the owner of a geothermal well to install and maintain meters, gauges, or other measuring devices and to report the readings of such meters, gauges, or measuring devices.

5.11 **Well Testing** - A flow test of each Type A-OS or Type B geothermal well shall be conducted for a continuous period of not less than seventy-two (72) hours unless the State Engineer specifies or approves a different period of time. The flow testing of any geothermal well shall not exceed a cumulative total of seven (7) days unless the State Engineer has granted prior written approval of additional testing. The State Engineer may impose other test requirements as deemed necessary. Copies of any temperature records and any fluid sample analyses obtained from the testing of geothermal wells shall be submitted with the Well Construction and Test Report (see Rule 12.7) or a plugging report (see Rule 12.12).

5.12 **Discharge of Geothermal Fluids** - An owner or operator of a geothermal well is responsible for being knowledgeable about, and complying with, regulations for discharge (as defined in Rule 4.2.11). All geothermal fluids produced by a well shall be disposed of in such a manner as to protect the environment and the public health. The well owner shall be responsible for obtaining and maintaining any discharge permits required by the Colorado Water Quality Control Division. (Note: Disposal of geothermal discharges to a sanitary or storm sewer may require approval from the owner or operator of the sewer system. Disposal of geothermal discharges into an individual sewage disposal system requires that the system has been specifically designed and approved for such disposal).

5.13 **Tests and Surveys** - When deemed necessary or advisable, the State Engineer has authority to require the well owner or operator to test for waste or contamination from a geothermal well. When requiring such tests or surveys, the State Engineer shall designate the time allowed for compliance, which deadline shall prevail over any other time provisions in these Rules.

5.14 **Noncompliant Conditions** - The well owner or operator shall notify the State Engineer within five (5) working days after the discovery of noncompliant conditions, or a violation of the terms and conditions of a permit. Notice shall be given to the State Engineer immediately upon discovery in the event of any fire, break or leak when the public health and safety or the environment are endangered, and the noncompliant condition or violation shall be corrected immediately. The notice shall contain the following information:

a. the permit number and name of the well;

b. a description of the violation and its cause;

c. the duration of the violation, including dates and times; if not corrected or use of the well discontinued, the anticipated time of correction; and,

d. steps being taken to reduce, eliminate, and prevent recurrence of the violation.

5.15 **Well Repairs** - All well repairs shall comply with the standards for new wells as established by these Rules. Owners or operators of Type A-OS, Type B, or reinjection wells shall provide a written repair plan to the State Engineer, and obtain State Engineer approval of the plan prior to commencing the repairs.

5.16 **Corrective Action and Well Plugging** - The State Engineer shall require corrective action in a manner or method approved by him of any condition that is causing or is likely to cause waste or contamination, or is threatening the public health and safety, and the environment. When deemed necessary by the State Engineer, the owner of a geothermal well shall be responsible for plugging the well in accordance with these Rules. Any order issued by the State Engineer requiring corrective action or the plugging of a geothermal well, shall specify the time period to complete the correction or plugging.

5.17 **Waste Prohibited** - The production or handling of geothermal resources, or the handling of products thereof, in such a manner or under such conditions or in such an amount as to constitute or result in waste is hereby prohibited.

5.18 **Priority for a Geothermal Resource** - A permit issued by the State Engineer pursuant to these Rules does not grant a priority for a geothermal right. A priority for a geothermal resource must be obtained in Water Court and is subject to the provisions of Article 92 of Title 37,C.R.S. (2003).

Rule 6 Geothermal Well Permit Requirements

6.1 **General** - A permit issued by the State Engineer shall be obtained prior to construction or use of any geothermal well. A copy of the approved permit shall be sent to the applicant. A copy of the permit shall be available and posted at the well or construction site at all times when constructing or performing any work on a well. All work shall comply with the conditions of approval of the valid permit and all work shall be completed prior to the expiration of the permit.

6.1.1 **Permit Requirement for a Certified Individual Constructing Loop Fields** - Prior to construction of loop fields for geoexchange systems pursuant to Rules 4.2.4 and 4.2.5., an individual shall obtain certification and an annual permit from the State Engineer pursuant to Rule 7.

6.1.2 **Permit Requirement for a Type A Open System (A-OS), Type B or Reinjection Well** - A permit must be obtained from the State Engineer prior to construction or use of a well for the following: exploration, appropriating geothermal resources, or for reinjecting geothermal fluids.

6.1.2.1 A permit is required for each exploration, production, or reinjection well, whether operated independently or as part of an interconnected system.

6.1.2.2 A permit is required prior to the construction of a new exploration, production, or reinjection well, or for replacement of an existing geothermal well used for such purposes.

6.1.2.3 A permit is required to convert the use of an existing well, which was originally constructed for some other purpose, to a geothermal well.

6.1.2.4 A permit is required prior to initial installation of production equipment for recovering geothermal resources from an existing geothermal well.

6.1.2.5 A permit is required for increasing the production from, expanding the use of, changing the producing interval of, or changing the type of use from an existing geothermal well (e.g. from exploration to reinjection).

6.1.2.6 If a permit application meets the requirements of Section 37-90.5-106, C.R.S. (2003) and the provisions of these Rules, the State Engineer shall issue the permit, subject to terms and conditions. A permit to construct and operate a geothermal well does not grant a geothermal right, nor does it allow for the owner or operator to enter upon lands not owned by him. The State Engineer shall act upon each application for a permit (under Rule 6.1.2) within six (6) months.

6.2 Application for a Permit - A permit application shall be submitted on a form prescribed by the State Engineer, along with such other information that may be required for evaluation of the application. The owner or designated agent shall sign and date the permit application, certifying that the information in the application is true to the best of his knowledge.

6.2.1 Application by a Certified Individual for a Permit to Construct Loop Fields - A permit application shall be submitted by a certified individual (see Rule 4.2.4) who will be involved in the construction of loop fields (see Rule 4.2.5). A permit shall be valid for one (1) year (see Rule 7.8). The State Engineer shall act upon each application for a permit (under Rule 6.1.1) within forty-five (45) days.

6.2.2 Application for a Type A Open System (A-OS) Well - A permit application shall be submitted prior to the construction or use of each Type A Open System well.

6.2.2.1 The application shall specify the depth and anticipated temperatures of the geothermal fluids.

6.2.2.2 When the subsurface geologic or hydrologic conditions are not known to the State Engineer, the applicant may be required to supplement the application with geophysical, geological and hydrological information of the subject area.

6.2.2.3 All well testing and well construction operations shall be suspended and the State Engineer shall be notified immediately when geothermal fluid temperature greater than two hundred and twelve (212) degrees Fahrenheit is encountered during the construction of a Type A geothermal well. No further construction shall be allowed unless a permit for a Type B geothermal well has been applied for and approved by the State Engineer. The well must comply with the construction standards for Type B wells.

6.2.2.4 Prior to submitting an application, the applicant shall give notice of the proposed well construction to the owners or operators of any valid, prior water or geothermal rights that are located within one half (½) mile of the proposed well. The notice shall be sent by certified mail, return receipt requested, and shall include a copy of the permit application. The notice shall instruct the owners or operators that they must submit a written objection to the State Engineer within forty-five (45) days of their receipt of the notice if they are opposed to the proposed well construction. The application shall specify whether the well will be used to explore or appropriate a geothermal resource, and if so, specify the proposed production rate and disposal of a geothermal fluid. Any secondary uses of a geothermal fluid or recovery of by-products shall be identified in the application. The application shall be supplemented with evidence showing that notice was given as provided above, and that the appropriation meets the provisions of Section 37-90.5-107 (3) or (4), C.R.S. (2003), and:

a. if the geothermal fluid appropriated is from a nontributary source as defined in section 37-90-103(10.5), C.R.S. (2003), the appropriation must comply with the Statewide Nontributary Ground Water Rules, 2 CCR 402-7 (1986);

b. if the well is located in the Denver Basin, the appropriation must comply with the Denver Basin Rules, 2 CCR 402-6 (1985);

c. if the well is located in a Designated Ground Water Basin, the appropriation must comply with the Ground Water Commission Rules, 2 CCR 410-1 (1992).

6.2.2.5 A permit may require reinjection of a geothermal fluid if necessary for the maintenance of the underground pressure and temperature, the prevention of subsidence, or the disposal of brine, and/or to prevent material injury to any valid, prior water or geothermal rights.

6.2.3 Application for a Type B Well - A permit application shall be submitted prior to the construction or use of each Type B well, and the State Engineer shall give notice to appropriate government agencies (see Rule 6.6).

6.2.3.1 The application for a Type B well shall specify the depth and anticipated temperature of the geothermal fluid.

6.2.3.2 When the subsurface geologic or hydrologic conditions are not known to the State Engineer, the applicant may be required to supplement the application with geophysical, geological and hydrological information of the subject area.

6.2.3.3 Prior to submitting an application, the applicant shall give notice of the proposed well construction to the owners or operators of any valid, prior water or geothermal rights that are located within one half (½) mile of the proposed well. The notice shall be sent by certified mail, return receipt requested, and shall include a copy of the permit application. The notice shall instruct the owners or operators that they must submit a written objection to the State Engineer within forty-five (45) days of their receipt of the notice if they are opposed to the proposed well construction. The application shall specify if the well is to be used to explore or appropriate a geothermal resource, and if so, specify the proposed production rate and disposal of the geothermal fluid. Any secondary uses of the geothermal fluid or recovery of by-products shall be identified in the application. The application shall be supplemented with evidence showing that notice was given as provided above, and that the appropriation meets the provisions of Section 37-90.5-107 (3) or (4), C.R.S. (2003), and:

a. if the geothermal fluid appropriated is from a nontributary source as defined in section 37-90-103(10.5), C.R.S. (2003), the appropriation must comply with the Statewide Nontributary Ground Water Rules, 2 CCR 402-7 (1986);

b. if the well is located in the Denver Basin, the appropriation must comply with the Denver Basin Rules, 2 CCR 402-6 (1985);

c. if the well is located in a Designated Ground Water Basin, the appropriation must comply with the Ground Water Commission Rules, 2 CCR 410-1 (1992).

6.2.3.4 A permit may require reinjection of a geothermal fluid if necessary for the maintenance of the underground pressure and temperature, the prevention of subsidence, or the disposal of brine, and/or to prevent material injury to any valid, prior water or geothermal rights.

6.2.4 Application for a Reinjection Well - A permit application shall be submitted prior to the construction or use of, each reinjection well (Type A or Type B), and the State Engineer shall give notice to appropriate government agencies (see Rule 6.6). Prior to submitting an application, the applicant shall give notice of the proposed well construction to the owners or operators of any valid, prior water or geothermal rights that are located within one half (½) mile of the proposed well. The notice shall be sent by certified mail, return receipt requested, and shall include a copy of the permit application. The notice shall instruct the owners or operators that they must submit a written objection to the State Engineer within forty-five (45) days of their receipt of the notice if they are opposed to the proposed well construction.

6.2.4.1 An application to construct or use a reinjection well shall include geological information and construction information showing that the geothermal fluid is being reinjected into the same reservoir or aquifer from which geothermal fluid is being appropriated. In addition, an application for a permit to construct or use a reinjection well with a proposed injection rate greater than fifteen (15) gpm or anticipated injection pressure greater than one hundred (100) psi shall be supplemented with construction plans and the following minimum information:

a. the casing and cementing programs;

b. depths to the top and bottom of the injection interval;

c. anticipated injection rates, pressures, and temperatures; and,

d. anticipated annual injection volume.

6.2.5 Permit Conditions - The permit shall set forth such conditions for construction, equipping and operating a geothermal well as are reasonable to prevent waste of the resource, contamination of the aquifers, or material injury to any valid, prior water or geothermal rights.

6.2.6 Recording of an Existing Geothermal Well - A geothermal well existing prior to July 1, 1983, not of record in the office of the State Engineer, may be recorded by submitting a Well Construction and Test Report with the appropriate filing fee on a form prescribed by the State Engineer. A well shall be considered to exist if it was actually operating and being used or was undergoing significant construction activities prior to operations on July 1, 1983, and subsequently was put to beneficial use without delay. All available data for the well, including construction and completion data, shall be submitted in the report.

6.3 Fees - Applicable filing fees for permits required by these Rules, and to change a permitted location greater than two hundred (200) feet, to replace a well, and to expand or change the use of a well are shown on the table below:

Permit Fees

Type of Permit	Construct and/or Appropriate	Replace	Expand/Change Use	Register Existing Well	Register and Replace Existing Well	Permit Extension
Certified Individual	$480 (yearly)	N/A	N/A	N/A	N/A	N/A
Type A-OS	$480	$240	$480	$340	$480	$200
Type B	$480	$240	$480	$340	$480	$200
Reinjection	$480	$240	$480	$340	$480	$200

6.4 Well Location - When selecting a site for a geothermal well, the well owner or operator shall consider the topography, surface drainage, access for maintenance and repair, and proximity of the well site to sources of contamination, such as leach fields, sewer lines and land fills. The well owner or operator shall comply with federal, state and local regulations concerning setbacks from structures and property lines if more stringent than these Rules.

6.4.1 Any well constructed on the well owner's property and within two hundred (200) feet of the permitted location shall be deemed to be at the approved location provided it meets the well spacing requirements of this Rule and permit conditions.

6.4.2 No geothermal well shall be located closer than one hundred (100) feet to the nearest source or potential source of contamination unless a variance has been obtained from the State Engineer. For purposes of this Rule, the appropriation and reinjection of a geothermal fluid into the same reservoir shall not be considered as a source of contamination.

6.4.3 A Type A-OS, Type B or reinjection well with a proposed production or injection rate greater than fifteen (15) gpm shall be located more than six hundred (600) feet from:

a. any existing or permitted geothermal well not owned by the applicant, and completed in the same reservoir; or,

b. any existing or permitted water well not owned by the applicant, and completed in the same reservoir; or,

c. any decreed, naturally flowing spring not owned by the applicant, unless the applicant can demonstrate that the source of the spring is not hydraulically connected to the geothermal reservoir.

6.4.4 A proposed well location not meeting the minimum distances specified in these Rules shall not be permitted by the State Engineer unless the following conditions are met:

a. the proposed location complies with the minimum well spacing established for a geothermal management district;

b. an application is submitted to the State Engineer setting forth all material facts involved and the manner and method of the proposed well completion. The application shall be supported by an outline of steps to be taken to prevent contamination by the well and/or material injury to any valid, prior water or geothermal rights;

c. the applicant shall give notice of the proposed well to the owners or operators of any valid, prior water or geothermal rights, which are not owned by the applicant and are located less than the specified minimum distance from the proposed well. The notice shall be sent by certified mail, return receipt requested, and shall include a copy of the permit application and the supplemental information required by paragraph (b) above. The notice shall instruct such owners and operators that they must submit a written objection to the State Engineer within forty-five (45) days of their receipt of the notice if they want to object to the proposed well. Evidence that this notice was given shall be submitted with the permit application; and,

d. no objection to the proposed well is filed within forty-five (45) days of receipt of the notice, and if the State Engineer finds that circumstances in this instance so warrant, he shall issue the permit. If an objection is filed, the State Engineer shall hold a hearing pursuant to the Procedural Regulations, 2 CCR 402-5 (1984), to determine whether particular circumstances warrant issuing a permit.

6.5 Replacement Well - A replacement well permit must be obtained prior to relocating or reconstructing an existing well, or changing the producing interval or depth of an existing well without changing the reservoir.

6.5.1 Replacement of a Type A-OS or Type B Geothermal Well - A replacement well shall be constructed within two hundred (200) feet of the original well and shall be constructed to produce from the same reservoir and serve the same purposes as the original well. In the event that the original existing well does not meet the spacing requirements specified in these Rules, the construction of the replacement well shall not worsen the current spacing conditions. The replaced well shall be plugged upon completion of the replacement well, and a plugging report submitted pursuant to Rule 12.12.

6.6 Notice to Other Agencies - Notice of any application, permit, order, or other action received or issued by the State Engineer may be given to any other government agency which may have information, comments, or jurisdiction over the well or activity involved. The State Engineer may enter into a memorandum of understanding with other agencies to eliminate duplication of

applications or other efforts. At a minimum, copies of an application will be provided by the State Engineer to the following agencies for review and comment:

a. Type B geothermal well to the Colorado Oil and Gas Conservation Commission;

b. geothermal reinjection well to the Colorado Water Quality Control Commission and the U.S. Environmental Protection Agency; and,

c. Type A-OS or Type B geothermal well located in Designated Ground Water Basins to the Colorado Ground Water Commission.

A response from other government agencies must be received within sixty (60) days. The State Engineer shall consider comments in deciding whether to issue a permit, and may incorporate such comments as conditions of a permit.

6.7 Expiration of Permit - A permit to construct a well shall expire one (1) year after being issued unless the constructor submits a Well Construction and Test Report. A permit to use an existing well shall not have an expiration date. A permit may be extended, if, prior to such expiration, a request to extend the permit is received by the State Engineer. A written extension request shall be submitted by the owner or operator, and shall provide reasons for not completing the well construction, an estimate of time necessary to complete construction of the well and a filing fee as set forth in Rule 6.3. A permit for a certified individual is valid for one (1) year. A permit must be obtained yearly by a certified individual prior to the completion of loop fields for geoexchange systems (see Rule 6.1.1.1).

6.8 Permit Denial – When denying a permit, the State Engineer shall state the reasons for the denial in writing. The permit application and the denial shall be filed and preserved by the State Engineer. A copy of the denial shall be sent to the applicant.

6.9 Hearing and Appeal - Any person aggrieved by a decision of the State Engineer pursuant to these Rules may, within sixty (60) days after such decision, petition for a hearing in accordance with the State Engineer's Procedural Regulations, 2 CCR 402 5 (1984). In an adjudicatory matter concerning a geothermal well, the final action of the State Engineer shall be subject to judicial review by the court having authority over the area in which the well is located.

Rule 7 Certification

7.1 To safeguard life, health, property, public welfare and the environment, the State Engineer requires all individuals who intend to construct or supervise the construction of loop fields for geoexchange systems to become “certified individuals” , as defined in Rule 4.2.4, prior to commencing such construction.

7.2 An application prescribed by the State Engineer shall be submitted to the Division of Water Resources by each individual who seeks to become a certified individual.

7.2.1 The application shall include the following information at a minimum:

a. applicant’s name, mailing address, and telephone number(s);

b. applicant’s company name, mailing address, and telephone number(s);

c. a copy of the individual’s or company’s insurance or bond under which the work will be performed.

7.3 An individual applying for certification shall provide the number of years of experience in performing either drilling, excavating, backfilling, or grouting, or supervising these procedures.

7.4 An individual who has submitted an acceptable application for certification shall successfully pass a written examination prescribed by the State Engineer. The examination shall assess the applicant's familiarity and understanding of these Rules and pertinent statutes. A score of seventy (70) percent or better shall be required to pass the written examination.

7.4.1 Upon written request, the State Engineer may waive the written examination requirement for an individual who is seeking reactivation of an expired certification.

7.5 Based upon an individual's application and written exam results, the State Engineer may require that the applicant appear for an oral examination. Such oral examination shall be in addition to the written examination.

7.6 An applicant requesting certification shall demonstrate adequate financial responsibility (insurance, compliance bond, or alternative funds) in an amount of at least ten thousand ($10,000) dollars, or show that the company for which services will be performed is providing such financial responsibility.

7.7 An applicant shall only be certified to perform, or to supervise the performance of, procedures for which he has demonstrated sufficient knowledge and ability, to the satisfaction of the State Engineer, for conducting such work.

7.7.1 A certified individual must be present at the site during the performance of work under his certification.

7.7.2 For reporting purposes, on projects with more than one certified individual, a specific certified individual may be designated to provide the required reports.

7.8 Certification shall be activated upon obtaining a geothermal well permit for the construction of loop fields for geoexchange systems. A permit shall be issued for a period of one (1) year and shall not be extended. A certified individual shall comply with all conditions of approval stated on the well permit and all work performed shall be reported under the permit number.

7.8.1 A certification shall expire on the expiration date of the geothermal well permit issued to the certified individual. Certification may be reactivated by obtaining a new geothermal well permit from the State Engineer. An individual who has not reactivated his certification for a period of two (2) years or more shall re-apply for certification.

7.8.2 Any construction of a loop field for a geoexchange system that is done without a valid geothermal well permit is a violation of these Rules. Such structures shall be subject to an order from the State Engineer to have the loops plugged.

Rule 8 Minimum Standards For Type A Geothermal Wells

8.1 Type A Geothermal Well (defined in Rule 4.2.28) - is generally constructed in one of three configurations. For purposes of these Rules, the three configurations are designated as a Type A-OS well (open system), a Type A-CLH well (horizontal closed-loop system), and a Type A-CLV well (vertical closed-loop system). Definitions for the geothermal well types are provided in Rule 4.

8.2 Type A-OS Well Construction - A Type A-OS well is constructed to withdraw a geothermal fluid from a subsurface aquifer or reservoir for extraction and utilization of the thermal attributes of the produced fluid. Therefore, a Type A-OS well is considered to be a "well" as defined in Section

37-91-102(16)(a), C.R.S. (2003), and its construction is under the jurisdiction and authority of the State Board of Examiners of Water Well Construction and Pump Installation Contractors.

8.2.1 Licensed Contractor Required - All well construction, repair, modification or plugging and all installation, repair or modification of producing equipment for a Type A-OS well shall be performed by a licensed contractor, a direct employee of a licensed contractor, or a person under the continuous on-site supervision of a licensed contractor having a valid license issued by the State Board of Examiners of Water Well Construction and Pump Installation Contractors.

8.2.2 Compliance with Water Well Construction Rules - Well construction and the installation of production equipment in a Type A-OS well shall conform, at a minimum, with the well construction, pump installation, well plugging, and disinfection standards of the Water Well Construction Rules, 2 CCR 402-2, and shall comply with any additional standards specifically established by these Geothermal Rules or specified in the conditions of approval stated on a valid geothermal well permit issued by the State Engineer.

8.2.3 Well Head and Protection Equipment - When temperatures greater than one hundred and twenty (120) degrees Fahrenheit or flowing conditions are encountered during the construction of a Type A-OS well, the owner or operator shall install and maintain in good working order blowout preventers and equipment to prevent the uncontrolled flow of fluid, and shall provide protective equipment for on-site personnel.

8.3 Construction Materials for Type A-CLH and Type A-CLV Wells - Construction materials to be buried below the ground surface or submerged in water for the construction of a loop field for a geoexchange system shall, at a minimum, meet the standards of these Rules. Where geologic, hydrologic, or thermal conditions require the use of materials exceeding the standards of these Rules, the certified individual shall be responsible for ensuring that the proper materials are used to protect the public health, ground water resources, and the environment.

8.3.1 The circulating pipes installed below ground level shall consist of high density polyethylene (HDPE) pipe meeting the standards specified in Section 1 of the International Ground Source Heat Pump Association, Oklahoma State University, publication “Closed-Loop/Geothermal Heat Pump Systems: Design and Installation Standards 2000” , or vinyl coated copper tubing specifically designed for use in geothermal applications.

8.3.1.1 All buried HDPE connections, joints and fittings shall be heat fused in accordance with the manufacturer’s specifications. Copper tubing shall be brazed utilizing the nitrogen brazing technique or as otherwise specified by the manufacturer. Testing shall be accomplished as specified in Rule 8.6.

8.3.1.2 Threaded connections or clamps shall not be used below ground level on any HDPE or copper tubing unless the joint is a service outlet that can be visually observed and inspected.

8.3.2 Grout materials approved by the State Engineer include the following:

a. neat cement;

b. cement-bentonite mixtures;

c. cement–fly ash mixtures;

d. high solids bentonite (at least thirty (30) percent solids by weight); and,

e. thermally enhanced grouts (cement-sand or bentonite-sand).

8.3.2.1 All grout materials shall be mixed by the method and in the proportions specified by the manufacturer. Excess water shall not be used in the preparation of grout materials. The type and amount (by weight) of each constituent used in the grout mixture shall be reported on a form prescribed by the State Engineer.

8.3.3 Only a non-toxic fluid shall be used in a Type A-CLH or Type A-CLV well. Fluids approved by the State Engineer are:

a. potable water;

b. aqueous solution of sodium or calcium chloride;

c. aqueous solution of potassium acetate containing less than one (1) percent corrosion inhibitors;

d. food grade propylene glycol;

e. methanol-water solution up to twenty (20) percent methanol by volume;

f. ethanol-water solution up to twenty (20) percent ethanol by volume; and,

g. R-22 refrigerant is approved for use in a closed-loop direct exchange (DX) system.

Use of any fluid or vapor not specified in this Rule requires a variance from the State Engineer prior to its use (see Rule 14).

8.4 Type A-CLH Well Construction (horizontal closed-loop) - Installation shall be in accordance with manufacturer and designer specifications and must be performed by or under the supervision of a certified individual. A Type A-CLH well need not be constructed by or under the supervision of a water well construction contractor licensed by the State Board of Examiners of Water Well Construction and Pump Installation Contractors.

8.4.1 Trenches or excavations for horizontal pipe/tubing loops shall be back-filled with materials no more permeable than the surrounding soil. Back-fill materials shall be clean and free of contaminants and shall be adequately compacted to minimize the potential for forming a depression or sump that would allow infiltration of surface run-off or other fluids.

8.4.2 A Type A-CLH well with loops designed for submergence in a body of water shall be equipped and tested in accordance with Rules 8.5 and 8.6. The certified individual shall take all necessary precautions to prevent leakage or spillage of the circulating fluid into the surface water reservoir that may adversely affect human health or the environment, and shall be equipped to contain any such leak or spill that may occur.

8.5 Type A-CLV Well Construction (vertical closed-loop) - The well shall be constructed in such a manner as to confine underground fluids in the aquifers in which they are encountered and to prevent contamination of surface or ground water resources. Installation shall be in accordance with manufacturer and designer specifications and must be performed by or under the supervision of a certified individual. A Type A-CLV well need not be constructed by or under the supervision of a water well construction contractor licensed by the State Board of Examiners of Water Well Construction and Pump Installation Contractors.

8.5.1 Boreholes drilled for a Type A-CLV well shall be of sufficient diameter so that there is not less than one (1) inch of space between the tubing or piping installed and the borehole wall to ensure proper grouting and sealing.

8.5.2 Boreholes for a Type A-CLV well shall be entirely filled with only approved grout materials. Grout shall be placed as a slurry through a tremie pipe and shall be placed in one continuous operation from the bottom of the hole upward. All grout shall be pumped and shall not be poured from the surface. Drilling fluids, drill cuttings or shale slurries are not grout materials and shall not be used to backfill boreholes constructed for a Type A-CLV well.

8.5.3 Grout shall be placed as soon as possible after installation of the pipe or tubing loop to prevent collapse of the borehole and the potential for an incomplete grout seal. Should such collapse occur, the pipe or tubing shall be removed, the borehole cleaned or re-drilled, and the pipe or tubing inspected and re-tested prior to installation. All reasonable attempts shall be made to remove the pipe from damaged boreholes. If the remaining pipe cannot be removed without damage to the bulk of the pipe in place, the loop and borehole shall be plugged pursuant to Rule 11.5.

8.5.4 In boreholes that penetrate a confining layer or layers, a minimum of forty (40) feet of cement grout shall be placed opposite each confining layer between ground water aquifers encountered in each borehole.

8.6 Testing of a Type A-CLH or Type A-CLV Well - All pipe/tubing, connections, joints and fittings which will be installed underground or submerged in water shall be tested at the designed working pressure prior to installation and visually inspected for leaks. Once installed, the underground or submerged portion of the closed loop shall be pressure tested at one hundred and fifty (150) percent of the designed working pressure for a minimum of thirty (30) minutes, and/or to the pipe manufacturer's testing specifications, whichever is greater. Pressures shall not decline by more than ten (10) percent during the test.

8.7 All geoexchange systems shall be equipped with a pressure shutdown switch.

8.8 Limits of a Type A Geothermal Well Exceeded - All well construction operations shall be suspended and the State Engineer shall be notified immediately when geothermal fluid temperature greater than two hundred and twelve (212) degrees Fahrenheit is encountered during the construction of a Type A geothermal well. No further construction shall be allowed unless a permit for a Type B geothermal well has been approved by the State Engineer and the well complies with the construction standards for a Type B well.

Rule 9 Minimum Standards For Type B Geothermal Wells

9.1 Well Construction - The construction standards of the Water Well Construction Rules, 2 CCR 402 2, shall apply to the construction of a Type B geothermal well, with the additions and modifications stated in this Rule. However, a Type B geothermal well need not be constructed by or under the supervision of a contractor licensed by the State Board of Examiners of Water Well Construction and Pump Installation Contractors.

9.2 Surface Casing - Steel surface casing must be set at least twenty-five (25) feet into impervious and competent bedrock to insure a solid anchor for blowout prevention equipment. Sufficient cement shall be used to seal the entire length of the surface casing.

9.2.1 In areas where subsurface formations and pressures are not known, surface casing shall not be set less than ten (10) percent of the proposed total depth of the well or a minimum of fifty (50) feet, whichever is greater.

9.2.2 In areas where subsurface conditions have been established by prior well construction, the surface casing shall be set at a depth to protect all known and potential aquifers and to prevent blowouts or uncontrolled flows, but in no instance shall the depth of steel surface casing be less than fifty (50) feet.

9.3 Protection or Production Casing - The setting depths and cementing intervals for each proposed well shall be designed and selected to prevent fluids from migrating through the annulus between the casing and the borehole. All well casings shall be selected and designed to protect against failure due to internal pressures, collapse due to external pressures, or corrosion.

9.4 Approved Grout and Placement- Only cement shall be used to grout a Type B geothermal well, unless other grouts have been specifically approved by variance from the State Engineer (see Rule 14). Cements and additives shall be selected to withstand anticipated temperatures and corrosive fluids. A cement slurry shall be placed by positive displacement in one continuous operation from the bottom of each interval or stage.

9.4.1 Cement shall be placed immediately above the top of any potential producing geothermal reservoir for a minimum interval of two hundred (200) feet or to the surface if the depth of the reservoir is less than two hundred (200) feet.

9.4.2 A minimum of fifty (50) vertical feet of cement shall be placed opposite each confining layer penetrated by the borehole (see Rule 4.2.7).

9.4.3 All cemented casing strings shall stand under pressure until the cement reaches a compressive strength of five hundred (500) psi. The condition "under pressure" will be complied with if a "float" or back pressure valve is used or if pressure is otherwise held on the casing and no back flow is observed.

9.4.4 All casing and cements shall be tested prior to resuming well construction operations. The test shall consist of applying a minimum pressure of five hundred (500) psi to the casing and holding that pressure for thirty (30) minutes. Test details shall be recorded and reported to the State Engineer.

9.5 Blowout Preventers - As soon as surface casing is set, a Type-B geothermal well shall have blowout preventers or control heads installed. This equipment shall be selected and designed to contain reasonably anticipated pressure and maintain control of the well at all times, and shall be maintained in good working order. This requirement for blowout preventers may be waived by variance from the State Engineer (see Rule 14) if the owner or operator can show from prior experience in the area that this equipment is not necessary.

Rule 10 Minimum Standards For Geothermal Reinjection Wells

10.1 Well Construction - A geothermal reinjection well shall be classified as Type A or Type B depending on the projected well depth and reservoir fluid temperature. The respective construction and plugging standards for Type A and Type B geothermal wells shall also apply to the construction and plugging of reinjection wells with the specific additions and modifications provided in this Rule.

10.2 Mechanical Integrity Test - A fluid shall not be injected into a geothermal reinjection well until a mechanical integrity test has been performed showing that the injected fluid will be confined to the designated reservoir. At least ten (10) working days prior to performing a mechanical integrity test, the owner or operator shall notify the State Engineer in writing of the scheduled date on which the test will be performed.

10.2.1 The mechanical integrity test shall include at least one of the following procedures to determine whether the casing, injection pipe, or packer leaks:

a. a pressure test of the injection pipe of not less than thirty (30) minutes and not less than three hundred (300) psi or the maximum projected injection pressure, whichever is greater, while monitoring annular pressures and/or fluid levels. A ten (10) percent loss or gain of pressure shall signify a failure of the test; or,

b. any test or combination of tests considered effective by the State Engineer.

10.2.2 In order to verify that a fluid will not escape vertically through the borehole, the mechanical integrity test shall be supported by one or more of the following:

a. cementing records;

b. tracer surveys;

c. cement bond log or other acceptable cement evaluation log;

d. temperature surveys; or,

e. any other test or combination of tests considered effective by the State Engineer.

10.3 Well Head Equipment - The well head equipment installed on a reinjection well shall be capable of controlling and monitoring expected injection and annulus pressures.

10.4 Testing of a Geothermal Reinjection Well - A flow test shall be performed on a geothermal reinjection well for a period of at least one (1) hour, and the results shall be reported to the State Engineer. The test shall be designed to provide data for the determination of hydraulic parameters of the injection interval and its suitability for the proposed reinjection.

10.5 Maximum Injection Pressure - The injection pressure for a geothermal well shall not exceed the maximum pressure approved by the State Engineer or a bottom hole pressure that will fracture the reservoir.

Rule 11 Plugging Of Geothermal Wells

11.1 Well Owner Responsibility - The owner of any geothermal well shall be responsible for the plugging of the well in accordance with these Rules. A plugging report must be submitted pursuant to Rule 12.12.

11.2 Plugging Standards - A geothermal well shall be plugged at or near ground level to prevent contaminants from entering and moving through the well bore. In order to confine subsurface fluids to the aquifers and reservoirs in which they were encountered, grout seals shall also be placed at each confining layer penetrated by the borehole, subject to the provisions of Rules 11.3, 11.4, and 11.5 for specific types of wells.

11.2.1 A minimum of fifty (50) feet of cement shall be placed at each confining layer separating aquifers. All cement plugs shall have sufficient strength to withstand maximum reservoir pressures.

11.3 Non-flowing Type A-OS Geothermal Well - A Type A-OS geothermal well, which does not flow at the surface, shall be plugged according to the provisions of the Water Well Construction Rules, 2 CCR 402 2. The plug lengths and locations, placement method and grout material shall be the same as specified in those Rules.

11.4 Type B, Reinjection or Flowing Type A-OS Geothermal Well - Prior to plugging a Type B, reinjection or a flowing Type A-OS geothermal well, the owner or operator shall provide a written plugging plan to the State Engineer. The plan shall describe in detail the equipment and materials to be removed from the well, the depth to the top of all plugs to be placed in the hole, the type and amount of cement to be used for each plug and the type and amount of materials to be placed between plugs.

11.5 Type A-CLH or Type A-CLV Well - Plugging shall be accomplished by pumping a cement slurry through the loops until all loops are filled. A super plastisizer may be added to the cement to improve pumpability. Clean water shall be circulated through the system prior to plugging to ensure that there is no blockage in the loops to be plugged.

Rule 12 Records And Reporting Requirements

12.1 Certification - All documents shall be signed by the person responsible for the work performed, certifying the truthfulness and accuracy of the documents. All original documents shall be submitted to the State Engineer.

12.2 Format of Reports - Reports shall be submitted on forms prescribed by the State Engineer, legible reproductions thereof, or computer generated forms patterned after the prescribed form upon prior approval by the State Engineer. "As-Built" drawings may be included but shall not be larger than 24 x 36 inches. All of the applicable data requested on any form shall be accurately reported.

12.3 Substitution of Forms - All forms required by these Rules shall be submitted on forms prescribed by the State Engineer. The State Engineer shall reject any form that cannot be legibly reproduced. Drawings, maps, and data supplementing a form shall not be larger than 24 x 36 inches.

12.4 Incomplete Forms - Forms submitted without the required information, filing fee or signature shall be returned as incomplete. The State Engineer shall inform the applicant or designated agent of any deficiencies on the permit application. If the applicant fails to correct the deficiencies and resubmit the permit application within the time requested, the State Engineer may consider the application withdrawn, and the fee shall be forfeited.

12.5 Retention of Records - The permit application and original permit and supplemental information shall be filed and preserved by the State Engineer and may be used in determining the extent of the uses made of the various geothermal resources.

12.6 Data Confidentiality - In the event that the information submitted falls within the purview of Section 24 72 204(3)(a)(IV), C.R.S. (2003), and upon written request by the owner or designated agent, the State Engineer shall deny the right of inspection of such data to any person and keep the data confidential for not more than one (1) year after submission.

12.7 Construction and Test Report - The well construction contractor or certified individual shall maintain detailed information during the construction and completion of a geothermal well. The information to be reported shall include at least the following: a detailed and accurate lithologic log; diameter, type, grade and depth of all casing; amounts, type, depths and placement method of all grouts used; construction and completion history; types of fluids and temperatures encountered; types and depths of production equipment installed; and copies of data from any flow or pressure testing. This information shall be submitted by the well construction contractor or certified individual to the State Engineer on a prescribed form within sixty (60) days of completing the well, or seven (7) days after the expiration of the permit to construct, whichever occurs sooner.

12.8 Production Records for a Type A-OS or Type B Well - In order to quantify the geothermal energy extracted, the well owner or operator shall maintain permanent records of the amounts of fluid

appropriated and areas heated. These records shall be collected at least monthly and shall be submitted to the State Engineer upon request. For wells appropriating a geothermal fluid, these records shall include as a minimum the appropriation rates and volumes and inflow and outflow temperatures.

12.9 Injection Records - The owner or operator of any geothermal reinjection well shall maintain permanent records of injection rates, injection volumes, fluid temperatures, injection pressures, and annulus pressures. These records shall be collected at least monthly and shall be submitted to the State Engineer upon request.

12.10 Geophysical Log, Survey and Well Test - When required by a geothermal well permit, any geophysical log, down-hole survey, or fluid sample analysis obtained during the construction and flow testing of a geothermal well shall be submitted with the Well Construction and Test Report.

12.11 Supplemental Report - The owner or operator shall furnish the State Engineer any information that the State Engineer may request to determine compliance with well construction standards and conditions of the geothermal well permit.

12.12 Plugging Report - The owner or operator shall submit a plugging report for each well that is plugged on a form prescribed by the State Engineer. The report shall identify the well which was plugged by location and permit number and provide a detailed description of the manner in which the well was plugged, including quantities and nature of materials used; and the method of placement, depth to, and the depth intervals of plugs installed in the well. If the staff of the State Engineer cannot witness the plugging of a Type B or reinjection well, the owner or operator shall submit a copy of the report or bill from the person installing the plugs, verifying the placement depths, and the types and amounts of materials used.

Rule 13 Geothermal Management Districts

13.1 Petition for a Geothermal Management District At the request of any person owning an interest in the land or a geothermal right within the area of a proposed geothermal management district, or on his own initiative, the State Engineer may establish a geothermal management district. The purpose of a district is to prevent the waste of the geothermal resource, maximize the economic recovery of a proven and delineated geothermal resource, and to protect vested or correlative water and geothermal rights. In such district, the State Engineer has the authority to control well spacing, to control the quantity of geothermal fluids extracted, to require the reinjection of the produced fluids, and to adopt plans for the most efficient use of geothermal energy.

13.2 Required Information The petition by a person or notice by the State Engineer for the establishment of a proposed geothermal management district shall include the following:

a. a description of the geothermal field to be managed, identifying the geothermal resource, its known geology and hydrology, and the energy which may be extracted;

b. a legal description and map of the geothermal field and the overlying land to be included in the management district;

c. a list of the owners and location of geothermal rights which will be included; and, any valid, prior water or geothermal rights which may be affected by the proposed district and a list of the owners of land on which those rights are located;

d. a comprehensive plan for the use of the geothermal resource and the type or nature of the administrative controls contemplated to maximize the economic recovery and prevent the waste of the resource. Such controls could consist of well spacing, allocation of production, or reinjection requirements;

e. a comprehensive plan for the equitable apportioning of the geothermal resources among the separately owned geothermal interests in the reservoir. The plan shall allocate an equitable and reasonable share of the geothermal resource to each owner;

f. requirements necessary for monitoring the extraction of the geothermal resource and for the protection of existing valid, prior water or geothermal rights in the area;

g. the time when the management district shall become effective, and the manner and circumstances under which the management district shall terminate;

h. provisions for amending the area and the operating criteria of the management district; and,

i. proposed name for the management district.

13.3 Creation of a Geothermal Management District Following the submittal of a petition to create a geothermal management district, the State Engineer shall evaluate the extent, geology and hydrology of the geothermal resource and the proposed district boundaries. Upon completing his review of the petition, the State Engineer shall determine whether there is sufficient information and basis to hold a hearing regarding the creation of the proposed district. Providing a hearing is held, upon completion of the hearing procedures, the State Engineer shall enter a written order based on the factual information presented. If the State Engineer determines there is insufficient information and basis to hold a hearing, he shall deny the petition and support such denial with written findings. A copy of the findings shall be sent to the person(s) who submitted the petition.

13.4 Delegation of Authority Any geothermal management district desiring to assume some or all of the State Engineer's authority granted in Section 37-90.5-108, C.R.S. (2003) for the administration of a geothermal resource shall submit a request in writing to the State Engineer. Such request shall document to the satisfaction of the State Engineer that the district has the organization, capability and resources to carry out the administration.

13.5 Special Field Rules - Specific rules may be adopted by the State Engineer for the operation of wells in a geothermal management district, which rules shall take precedence over a general rule promulgated herein.

Rule 14 Variances

14.1 General - When the strict application of any provision of these Rules presents practical difficulties or unusual hardship, a written request for a variance from the Rules may be submitted. The well construction contractor or certified individual must show that the requested variance will comply with the intent of these Rules to protect the public safety, health and environment, and prevent the waste or contamination of surface or ground water, as well as the geothermal resource. Variance approval must be obtained prior to construction of the well, or, if a variance is requested due to circumstances or conditions that may exist during well construction, such variance must be obtained prior to well completion.

14.2 Written Request Required – Any request for a variance from a Rule or Rules shall be submitted to the State Engineer in writing and shall be signed by the well owner or operator. Such request shall specify:

a. the Rule or Rules from which a variance is sought;

b. what the proposed variance is and the reason for seeking it;

c. if construction-related, the proposed construction details (diagram of proposed structure); and,

d. special precautions that will be taken to protect the well and the environment from contamination.

14.3 Consultation Required - No variance to these Rules concerning Type B and reinjection wells will be granted by the State Engineer without prior consultation with the Oil and Gas Conservation Commission, the Water Quality Control Division, or the Water Quality Control Commission.

14.4 Written Response - The State Engineer shall respond in writing to a variance request in a reasonable amount of time stating the reasons for the decision and imposing conditions necessary to implement the intent of these Rules, if a variance is approved.

Rule 15 Severability

If any portion of these Rules is found to be invalid, the remaining portion of the Rules shall remain in force and unaffected.

Rule 16 Revisions

These Rules may be revised in accordance with Section 24 4 103, C.R.S. (2003).

Rule 17 Statement Of Basis And Purpose Incorporated By Reference

The Statement of Basis and Purpose for these Geothermal Rules is incorporated by reference as part of these Rules.

Rule 18 Effective Date

These revised Rules shall become effective on September 30, 2004.

Hal D. Simpson, State Engineer

Editor's Notes

History