

STEPS FOR APPLYING FOR TYPE A OR B GEOTHERMAL WELL PERMIT

The following steps are provided as a "checklist" of actions an applicant should follow in applying for a Type A Open System (A-OS) or Type B well permit pursuant to the Geothermal Rules (2 CCR 402-10). Applicants must abide by the Geothermal Rules; this checklist is not a substitute for knowledge and adherence to those Rules. A Type A geothermal well is defined as having a total depth not exceeding 2,500 feet or encountering geothermal fluids having a temperature not exceeding 212°F. A well exceeding 2,500 feet in depth or encountering geothermal fluids exceeding 212°F is a Type B geothermal well. A geothermal reinjection well (Type A or B) is a well to be used to reintroduce geothermal fluids back into the same reservoir from which they were produced, either by pressure at the surface or by gravity flow. All permits for geothermal wells should be applied for on the SEO's Form No. GWS-45, General Purpose Water Well Permit Application.

FEES: Each geothermal well application must be submitted with a \$480 filing fee (Rule 6.3). Acceptable forms of payment are check or money order, payable to the Colorado Division of Water Resources, and Visa, MasterCard or Discover (card number and expiration date must be provided on a separate attachment). **Fees are nonrefundable.**

INJURY TO ANY VALID, PRIOR WATER OR GEOTHERMAL RIGHT: CRS 37-90.5-107(8) and (3)(a) provides a statutory definition of "material injury" and requires the State Engineer to make a finding that the proposed appropriation will not materially injure a valid, prior water or geothermal right. The applicant should give consideration to this before proceeding with the steps below as this may influence how the applicant approaches their geothermal "project", and what information they deem necessary to provide to owners of valid, prior water or geothermal rights in an effort to allay any injury concerns. We would note that the potential for injury can be "minimized" with reinjection of geothermal fluids back into the geologic reservoir of origin.

STEPS:

1. Prior to submitting an application, the applicant shall provide notice by certified mail, return receipt requested, to the owners or operators of any valid, prior water or geothermal rights that are located within ½ mile of the proposed well. The notice must include a copy of the permit application(s) to be submitted to the SEO. We also suggest that as much information as possible be provided to the notice recipients to address questions/concerns they may have. The recipients have 45 days from receipt of this notice in which to submit a written objection to the SEO if opposed to the proposal (Rules 6.2.2.4, 6.2.3.2 and 6.2.4).
2. When the applicant has received the signed and dated certified mail return receipts from the post office, the applicant should submit the completed permit applications w/ fees, copy of notice materials, evidence of certified mailings and any other documentation supporting the applications that the applicant intends to submit, to the SEO for evaluation.
3. For a Type A and B well permit, the application shall specify the depth and anticipated temperature of the geothermal fluids (Rules 6.2.2.1 and 6.2.3.1).
4. If the subsurface geologic or hydrologic conditions are not known to the SEO, the applicant may be required to supplement the application with geophysical, geological and hydrological information of the subject area (Rules 6.2.2.2 and 6.2.3.2). [see Components of a Geologic/Hydrogeologic Report on page 2]
5. For a reinjection well permit, the applicant 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 will be appropriated. If the injection rate is greater than 15 gpm or anticipated injection pressure is greater than 100 psi, the application 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. (Rule 6.2.4.1).
6. For a geothermal exploration well permit application, the applicant shall support the application with a plan of how geothermal fluids produced from any flow testing of the well will be disposed of in such a manner as to protect the environment and the public health, and without any beneficial use of the geothermal fluids.

NOTICE TO OTHER AGENCIES: Type B to the Colorado Oil and Gas Conservation Commission; Reinjection to the Colorado Department of Public Health and Environment, Water Quality Control Division and the U.S. Environmental Protection Agency; Type A or B inside the Designated Ground Water Basins to the Colorado Ground Water Commission. These agencies have 60 days to provide responses to the SEO (Rule 6.6).

IF YOU HAVE ANY QUESTIONS regarding the above, please contact the Division of Water Resources at (303) 866-3581.

COMPONENTS OF A GEOLOGIC/HYDROGEOLOGIC REPORT

The following outlines the information the SEO would like to see in the report that may be required pursuant to Geothermal Rules for Type A geothermal wells (6.2.2.2) and Type B geothermal wells (6.2.3.2). This report is necessary if there is no known geothermal production from the target formation and if there is minimal information on the geology at the well location. The form and content of the report is not prescribed in the Geothermal Rules and thus is determined by the applicant. The following outline defines the components that the SEO will find most helpful in determining the conditions that will be attached to a geothermal well permit.

1) Description of the Drilling Location:

- a) Legal Location
- b) Presiding local government(s) – county and municipality (if applicable)
- c) Geographic Setting
 - i. Hydrology – streams, reservoirs, wetlands at or near the drill site
 - ii. Elevation
 - iii. Topography
 - iv. Nearby Roads
 - v. Site Access
 - vi. Nearby structures

2) Description of Geology and Hydrogeology – from land surface to target depth

- a) Description of Stratigraphy and Geologic Structure
 - i. Type of sediment/rock
 - ii. Thickness of geologic units
 - iii. Estimated depth to the top and bottom of each formation to be penetrated
 - iv. Geologic structure of the geothermal reservoir
- b) Description of Hydrogeology
 - i. Identify known freshwater aquifers to be penetrated
 - ii. Identify confining units to be penetrated
 - iii. Identify hydraulic conductivity, transmissivity, porosity, specific yield or storage coefficient of important units:
 1. Geothermal reservoir geologic formation(s)
 2. Geothermal reservoir confining unit(s)
 3. Subsurface vertical and lateral boundaries of the geothermal reservoir

3) Well Construction with Respect to Hydrogeology

- a) Description of the proposed well construction which includes
 - i. Description of the how the segregation and integrity of fluid-containing geologic units will be maintained in the well bore - whether freshwater, saline water, petroleum, or natural gas.
 - ii. Well construction information should include:
 1. A plan of casing sizes and interval depths
 2. A description of the drilling mud program
 3. A description of the well bore and casing cementing program
 4. Casing head information
 5. For Type B wells, a description of the type of blowout preventer to be used
 6. A description of the potential drilling hazards, both geological issues (overpressure zones, lost circulation zones, etc) and well construction safety precautions. The description should include proposed mitigation strategies.