



## GEOTHERMAL REGULATIONS FREQUENTLY ASKED QUESTIONS

The Discussion Draft of proposed regulations can be found at

<https://www.conservation.ca.gov/calgem/Pages/Oil,-Gas,-and-Geothermal-Rulemaking-and-Laws.aspx>

### What is a geothermal well? How are geothermal wells used in California?

A geothermal well is a well that extracts the heat stored in rocks and fluid in the Earth's crust. The fluids and heat extracted can be used for both commercial and non-commercial purposes including hot tubs and hot springs, the heating of buildings and greenhouses, a myriad of industrial uses, and the generation of power. The depth of a geothermal well depends upon the depth where heat can be found at a specific location. Geothermal injection wells are used to return the fluids to the earth after the heat has been extracted to sustain the natural resource.

### Who is responsible for regulating geothermal wells and geothermal activities?

The California Geologic Energy Management Division (CalGEM) of the Department of Conservation has primary responsibility for the regulation of geothermal wells in California. CalGEM's jurisdiction is limited to the geothermal well itself, any subsurface activity, and the surface equipment necessary to operate the well. Surface activities that are supported by geothermal wells are regulated primarily by the local jurisdiction where the well is located, with power plants having additional oversight by the California Energy Commission if they are over 50 net megawatts. The Department of Toxic Substances Control, Department of Fish and Wildlife, State Lands Commission, local air quality districts, and regional water quality boards may also be part of the permitting for most surface activities.

### What is the relationship between geothermal wells and lithium development?

Recent developments in technology make the extraction of the lithium element from geothermal fluids produced by a geothermal well possible. After using the heat from the geothermal fluids to produce geothermal power and before reinjecting the fluid, the lithium and other minerals present in the geothermal fluids may be recovered. This technology is primarily being utilized at the Salton Sea geothermal resource to develop a domestic source of lithium with economic and other benefits. The lithium recovery operations would take place as part of the surface system that is used for a geothermal power plant. While CalGEM has jurisdiction over the wells from which the geothermal fluids and lithium are produced, CalGEM does not have jurisdiction over the lithium recovery activities occurring at the surface system. The geothermal regulations will affect all geothermal wells but not the surface systems associated with lithium development.

### What is the purpose of these new proposed regulations for geothermal wells?

Many of the existing geothermal regulations were put in place in the 1970's and have not been updated for more than 45 years. During that time, significant developments in science and technology have identified best practices and improved knowledge that need to be incorporated into the geothermal well regulations to ensure that California's geothermal operations are regulated safely and effectively. The new technologies include drilling and completion technologies, monitoring of subsidence, and updated requirements for injection wells that are critical to the sustainability of the geothermal resource and protection of groundwater resources.

### What changes would be implemented by these proposed regulations?

The proposed regulations would amend 28 existing regulatory sections, delete 18 existing regulatory sections, and add 15 new sections. The changes are comprehensive, with updates to reflect developments in science and technology, to clarify requirements, and to expand reporting of technical data related to well operations and injection processes. More specifically, the following changes have been incorporated:

- Geothermal "resource" vs "fluid": The current regulations are focused on the use of geothermal fluids. But new technologies may make it possible to mine the heat of the resource directly without accessing the fluids or extracting them using a well. To ensure that these new technologies are still conducted safely under the regulations, the use of the term "fluid" has been changed to "resource."
- Idle well vs observation well: An observation well is used to monitor the temperature and pressure of a reservoir and is exempt from the annual assessment fee. Whereas when an observation well is not being used to monitor temperature or pressure, the well is an idle well and subject to the annual geothermal assessment. The proposed regulations more clearly articulate how the status of being an idle well functions in concert with a new observation well classification system.
- Plugging and abandonment standards: Operators and CalGEM have identified a potential to harm a geothermal resource if the current plugging and abandonment standards are used for hydrothermal resources. This is because excess cement may exit the well during plugging and plug up the reservoir. In addition, lessons learned over 40 years provide significant improvements to plugging and abandonment requirements with a focus on a solid cement plug from the lower most casing shoe to the surface. The revisions to the plugging and abandonment standards for geothermal wells reflect the latest understanding of how geothermal wells should be plugged and abandoned to prevent damage to the geothermal resource and prevent the well from becoming a potential conduit for contamination. These changes will ensure the protection of public health and safety, natural resources, and the environment.

- Subsidence monitoring: The removal of fluids from under the earth can cause the land above to sink, this phenomenon is called "subsidence." Subsidence can be associated with geothermal well activities unless operators carefully balance the volume of fluids extracted with the volume of fluids injected. Under the existing regulations, only operators in Imperial County are required to monitor for subsidence, but we know from experience that subsidence can be an issue anywhere geothermal resources are being accessed. The proposed regulations would require subsidence monitoring by all operators and expands the types of technologies that can be used to monitor, such as satellite imaging.
- Informational records: Operators will also be required to submit more extensive informational records including detailed wellbore diagrams, corrosion risk assessments, injection project data, engineering and geology studies, and an injection plan similar to those required of oil and gas operations.
- Well Site and Lease Restoration: Revises well site and lease restoration requirements to more clearly delineate the action an operator must take when restoring a well site versus when an operator is restoring the lease.