

Geothermal Resources Prospecting Permits

Updated June-2015

HISTORY

The first permit to prospect for geothermal resources on State-owned lands in California was issued by the State Lands Commission (CSLC) in July 1960. That permit covered a 40-acre parcel near the Salton Sea in Imperial County. The first permit on State-owned lands at The Geysers in Sonoma and Lake Counties was not issued until June 1966. By 1967, however, two dozen permits had been issued in those two parts of the State. The permits were issued under provisions of the Public Resources Code (PRC) and the California Administrative Code for minerals other than oil and gas. Code provisions specifically pertaining to geothermal resources did not exist at that time.

In 1967, the California Legislature passed the Geothermal Resources Act. The Act amended the PRC to establish a framework within which the CSLC could permit and lease State-owned lands for geothermal exploration and development. The Act added Article 5.5–Geothermal Resources (§ 6902 to § 6925) to Division 6–Public Lands, Part 2–Leasing of Public Lands, Chapter 3–Oil and Gas and Mineral Leases. Article 5.5 was later amended by Statutes of 1971, 1978, 1983, 1985, 1989, and 2001, with the Statutes of 1978 involving the most substantial modifications.

Since passage of the Geothermal Resources Act, the CSLC has issued another 72 geothermal prospecting permits in eight different counties – Imperial, Sonoma, Lake, Mendocino, Mono, Inyo, Modoc, and Lassen. Approximately 90 permits were issued between 1960 and 1984. None were issued between during the next 22 years. Permits were issued in 2006 and 2011 for the same parcel of State-owned lands in Inyo Co. An application for a new permits north of The Geysers is currently being processed. In 2011 and 2013, CSLC issued two new prospecting permits located in Inyo and Siskiyou County. Brief summaries of permitting activity by geographic area are given in the following sections.

IMPERIAL VALLEY (Imperial County)

Between 1960 and 1984, the CSLC issued 18 geothermal prospecting permits in the area along the southeast shore of the Salton Sea and six permits in the Truckhaven area, west of the Salton Sea. Some of these permits covered the same lands but at different times. Despite the number of permits involved, actual exploration was limited to the drilling of three deep wells.

The first dozen permits in this area were issued to a geologist named R.W. Cypher and covered lands near the Salton Sea's southeastern shore. In 1964, Cypher contracted with Shell Oil Co. to drill an exploratory well which confirmed the presence of geothermal resources. As a result, the CSLC converted four contiguous permit parcels into State Geothermal Resource Leases PRC 3143, 3144, 3145, and 3146. The leases covered State lands within the Department of Fish and Game's Hazard Unit of the Imperial Wildlife Management Area. In 1974, the CSLC combined the four leases into Lease PRC 4976 and assigned it to Imperial Thermal Products. The lease was later assigned to Imperial-Magma. No subsequent exploration or development activity occurred, so the lease expired in 1984. In 1992, a portion of the same DFG lands were re-leased through negotiation with Magma Power Co., a subsidiary of CalEnergy, as Lease PRC 7621. The

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remaining DFG lands were added to the lease in 2001, and then removed in 2011 to form a separate lease, PRC 8916.

Two other prospecting permits were converted to leases along the Salton Sea's southeast shore. In 1983, the CSLC issued permit PRC 6378 on a 40-acre parcel north of the Hazard Unit. This was the site of the very first permit in 1960. The parcel is classified as sovereign land as it was acquired in exchange for lands along the Colorado River in 1956. The 1983 permit was issued to Kennecott Corp. A deep scientific well, funded in part by the Department of Energy, was drilled there in 1985-86. The well confirmed geothermal resources, and so the permit was converted into Lease PRC 6378 in 1987. The lease was later assigned to Freeport McMoRan Resource Partners (FMRP) and then CalEnergy's Magma Power Co. When a commercial project could not be developed, the lease was quitclaimed. In 2012, the CSLC issued a lease, PRC 9000.1, to EnergySource LLC..

Two miles further north of the Hazard Unit, the DFG owns a large parcel of lands designated the Wister Unit. The parcel had earlier been under permit to R.W. Cypher and later the Atlantic Oil Company, but never explored. In 1984, the CSLC issued a new permit to Kennecott for this large parcel. The permit was PRC 6552. In 1987, a successful well was drilled. In 1989, the permit was converted into Lease PRC 6552 and immediately assigned to FMRP. Like nearby PRC 6378, this lease was later assigned to Magma, and then quitclaimed without being developed. In 2014, the CSLC issued two separate leases on behalf of Fish and Wildlife, PRC 9115.2 and 9116.0, for a non-surface occupancy lease. In 2014, the Lessee filed a partial quitclaim deed for PRC 9116.0 and a full quitclaim deed for PRC 9115.2. The Commission approved at the February 20, 2015, meeting.

On the west side of the Valley, near Truckhaven, the CSLC issued six prospecting permits in 1982. The permittees included Phillips Petroleum and Holly Energy. A well was drilled on adjacent private lands and provided encouraging results. In 1985, the CSLC issued Lease PRC 6837, which contained portions of the six permits. The lease was combined with Federal and private leases within a geothermal unit formed by Unocal Geothermal and other companies, but commercial development never occurred and so the lease was quitclaimed. In the last few years there has been renewed interest in the Truckhaven area, and re-leasing has been proposed. The current application we have for leasing of the Truckhaven area is under ORNI 5 LLC.

THE GEYSERS REGION (Sonoma, Lake, Mendocino Counties)

The CSLC has issued a total of 40 permits in The Geysers region, where the State owns more than 10,000 acres of reserved mineral interest School lands. Of those 40 permits, 34 were issued between 1966 and 1970, with the balance issued between 1973 and 1983. Some of the permits covered the same lands but at different times. Most of the original applications submitted for permits in this area were "matched" by surface owners pursuant to provisions included in the Geothermal Resources Act of 1967. Most of the permits ultimately expired, and very little exploratory drilling actually occurred while under permit. However, the first deep well drilled on State lands at The Geysers was completed in May 1969 and flow-tested at 200,000 pounds per hour of dry steam.

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In 1971, the CSLC combined a number of permit areas and then converted the lands into two large leases designated PRC 4596 and 4597. The leases were held by three companies – 50% Union Oil Co. of California (later Unocal Geothermal), 25% Magma Power Co., and 25% Thermal Power Co. The leases cover nearly 4,000 acres of State reserved mineral interest lands in the center of The Geysers Geothermal Field. The leases became productive in July 1972, and have been productive for more than 32 years now. During that time the leases have produced nearly 1.3 trillion pounds of steam. No other State leases in the region came into existence through the conversion of a prospecting permit. Instead, in 1976 and 1982, the CSLC conducted competitive lease sales for several parcels of State lands surrounding the two large leases. The biddable factor selected by the CSLC for the lease sales was not an upfront cash bonus, but rather a percentage of the net profits from development of the geothermal resources. A total of 12 leases were issued via competitive public bidding. In 1983 and 1985, eight leases were acquired from the Federal government via the indemnity selection process. The BLM had issued the leases through competitive bid lease sales in 1974, 1979, and 1982, but they had not yet become productive. In 1993, the CSLC conducted another competitive bid lease sale, but no bids were received. Finally, in 1994, 1995, and 2004, the CSLC issued four leases through direct negotiation. The State currently has seven active leases at The Geysers.

Two prospecting permits issued by the CSLC in Lake and Sonoma Counties were well beyond The Geysers Field. In 1977, a permit was issued on State lands in the Boggs Mountain State Forest, five miles east of The Geysers. And in 1983, a permit was issued at the Sonoma State Hospital, 15 miles southeast of Santa Rosa. A 4,300-foot deep well was drilled in the State forest, and a 1,500-foot deep well at the hospital site, but neither well yielded promising results.

In December 2012, the CSLC issued a prospecting permit to High Valley, LLC. High Valley proposes to re-enter two wells on two existing drill sites, clean-out and stabilize the wells until geothermal resources are encountered. In November 2014 High Valley, LLC allowed their geothermal prospecting permit to expire.

MONO LAKE (Mono County)

In 1969, the CSLC issued 12 permits for prospecting beneath Mono Lake. The permittees included Geothermal Resources International and Southern California Edison. Two exploratory wells were drilled from locations along the lake shoreline, to depths of 4,100 feet and 2,400 feet, but the results were not promising. In 1971, the CSLC issued a permit to the USGS to conduct a seismic study at Mono Lake. In 1974, another permit was issued to the USGS to re-enter the two abandoned test wells, but no record was found explaining the intended purpose or whether the work was actually done.

OWENS LAKE (Inyo County)

In 1973, the CSLC issued three permits within the dry lake bed of Owens Lake to Getty Oil Co. Geological and geophysical surveys were conducted, and two temperature gradient holes were drilled to about 500 feet, but the results were not promising.

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SURPRISE VALLEY (Modoc County)

During 1973 and 1974, the CSLC issued nine permits within the beds of Upper, Middle and Lower Alkali Lakes in remote Modoc County. The permittees included Getty Oil Co., Gulf Oil Corp., and American Thermal Resources. No records could be found to indicate that any wells or temperature gradient holes were drilled on the permitted lands. But according to the Division of Oil, Gas, and Geothermal Resources (DOGGR), Magma Power Co. drilled three exploratory wells in 1959, and two more in the early 1970s. The wells were drilled on private lands west of the Upper Alkali lakebed. The drilling yielded encouraging results, but the area was never developed. In 2001, a company called Lake City Geothermal LLC drilled a deep slim-hole in the same area. In 2003, they acquired and then flow tested one of the wells that was previously drilled in the 1970s, and then drilled nine shallow temperature gradient holes. Lake City Geothermal plans to drill up to six slim-hole exploratory wells in the area, about a half mile from the lakebed. The company may be interested in the nearby State lands.

HONEY LAKE AREA (Lassen County)

In 1974, the CSLC issued a prospecting permit to Gulf Oil Corp. on a School lands parcel near the shore of Honey Lake. No records could be found to indicate that any wells or temperature gradient holes were ever drilled. In 1993, a request was received for a prospecting permit on the same parcel, but the applicant failed to pursue it.

NORTHWEST OF COSO (Inyo County)

In 2006, the CSLC issued a permit to Deep Rose LLC (Deep Rose) to prospect for geothermal resources on a 640-acre parcel of school lands five miles northwest of the Coso geothermal field. The permit was extended for two years in 2008. Deep Rose was unable to obtain financing to drill an exploratory well and so the permit expired in 2010. In 2011, the CSLC issued a new permit to Deep Rose, and in 2013, the CSLC extended the permit for an additional two years. The application is expected to expire in fall of 2015, but Deep Rose has showed interested in applying for a new permit. The State parcel is surrounded by Federal parcels that could be offered for lease as part of the U.S. Bureau of Land Management (BLM) Haiwee Geothermal Leasing Area. If the area contains geothermal resources in commercial quantities, development will likely require a project that combines State and Federal lands.

LOWER KLAMATH NATIONAL WILDLIFE REFUGE (Siskiyou County)

In 2012, the CSLC issued a permit to Entiv Organic Energy LLC (Entiv) to evaluate the possibility of generating electric power from low-temperature geothermal water. The permit covers approximately 520 acres of 100 percent reserved mineral interest in State School Lands. The surface of the parcel is owned by U.S. Fish and Wildlife Service. In 2014, Entiv submitted a letter that they have proven commerciality and have applied for a Preferential Lease with the State.

FAILED APPLICATIONS

According to the CSLC's file records, there were several dozen applications for geothermal prospecting permits submitted in the early 1970s that never resulted in permits being issued. The

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applications included many in The Geysers region, particularly for the bed of Clear Lake. Other areas included Mono Lake, Honey Lake, and Randsburg. In the 1980s, many more applications were submitted for permits covering the bed of Clear Lake, but all were denied by staff.

In 2001, the CSLC received applications from two companies for geothermal prospecting permits covering about 3,840 acres near Truckhaven in Imperial County. The lands include lands that were formerly under permit and under lease. Some parcels are within the Department of Parks and Recreation's Ocotillo Wells State Vehicular Recreation Area. The applications cannot be processed further because the applicants did not pursue environmental documentation through Imperial County. The lands are now proposed for leasing and inclusion within geothermal units being considered in the area. The units will involve Federal and private leases.

CURRENT APPLICATIONS

There are no geothermal resources prospecting permits applications presently pending.