

**Proposed Agreement between California Energy Commission
and
Layman Energy Associates, Inc**

Title: Exploratory Well to Confirm Liquid-Dominated Hydrothermal Resource on Margin of The Geysers Steamfield, Lake County, California
Amount: \$2,377,364.00
Term: 33 months
Contact: John Hingtgen
Committee Meeting: 5/10/2011

Funding

FY	Program	Area	Initiative	Budget	This Project	Remaining Balance	
09	Geothermal	Renewables	Geothermal	\$4,500,000	\$2,177,364	\$0	0%
10	Geothermal	Renewables	Geothermal	\$1,150,000	\$200,000	\$158,135	14%

Recommendation

Approve this agreement with Layman Energy Associates, Inc. (LEA) for \$2,377,364. Staff recommends placing this item on the discussion agenda of the Commission Business Meeting.

Issue

At present, virtually all production from The Geysers is derived from the dry steam reservoir which characterizes this resource. Field operators have not yet recognized the excellent potential for development of a significant, liquid-dominated hydrothermal resource near the southeast boundary region of the steam reservoir in the Northern California Power Agency (NCPA) project area. A SE-trending geologic structural zone defined by shallow steam entries in the NCPA wellfield appears to channel flow of steam condensate away from the Geysers towards Long Ridge. The proposed new well will test the center of the prospective region near Long Ridge and will be appropriately completed and tested to evaluate a liquid-dominated resource.

Background

The Geysers in northern California with a current average output of about 850 MW is one of the largest geothermal fields in the world. Marginal southeast region wells in the NCPA project area produce mixtures of water and steam, and the steam reservoir boundary in this area is open and permeable. This contrasts to sharp, low permeability boundaries to the steam reservoir around most of The Geysers field. The outflow of condensate along this structural zone is indicated by a SE-trending thermal anomaly defined by shallow and intermediate-depth gradient holes. This condensate outflow along the SE-trending structural zone is inferred to comprise the productive liquid-dominated resource at Long Ridge. Critical data in support of the condensate outflow model at Long Ridge is provided by the Dry Creek no. 1 well. This well was drilled by Chevron in 1977 to a depth of 8,600 feet at the southeastern end of the Long Ridge shallow thermal anomaly, about two miles from the steam reservoir boundary. This well encountered a convective 320-340°F zone below 4,800 ft. depth and several associated major fluid loss zones / fluid entries during drilling indicating very high reservoir permeability. Chevron cemented and cased off these water-productive zones as they were seeking dry steam production at the time, and thus the well was never properly evaluated for production of a liquid-dominated resource.

Proposed Work

This project will:

Drill and test an 8,000 foot deep exploratory well to confirm the presence of a productive, liquid-dominated hydrothermal resource near the southeast margin of The Geysers steamfield near Long Ridge.

Drill the well on private lands for which LEA has secured geothermal leasing rights from the Peterson Family Trust;

Drill the well in the center of a highly prospective area defined by: an extension of a SE-trending structural zone in the SE Geysers indicated by shallow steam entries; a thermal anomaly defined by shallow and intermediate depth gradient holes; and a highly permeable, 320-340°F convective zone penetrated by the Chevron Dry Creek no. 1 well at depths below 4,700 feet;

Document the key results of the drilling and testing program in reports;

Stimulate industry exploration of structurally and hydrologically analogous areas to Long Ridge located in the NW Geysers at the Hoil Creek-Mahnke Peak and NW Big Sulfur Creek areas.

Justification and Goals

This project "[will develop, and help bring to market] advanced electricity technologies that reduce or eliminate consumption of water or other finite resources, increase use of renewable energy resources, or improve transmission or distribution of electricity generated from renewable energy resources" (Public Resources Code 25620.1.(b)(4)), (Chapter 512, Statutes of 2006)).

This project also addresses development of geothermal resources within the GRDA legislation.

This will be accomplished by:

- Exploratory drilling to develop new geothermal resources.