

THE DESERT PEAK EAST EGS PROJECT: A PROGRESS REPORT

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ABSTRACT

An industry-DOE cost-shared project is underway to evaluate the technical feasibility of developing an EGS power generation project on the eastern side of the Desert Peak geothermal field. An existing well (DP 23-1) is the focus of much of the Phase I investigation, including re-interpretation of lithology, acquisition and analysis of a wellbore imaging log, conducting and analyzing a step-rate injection test, performing a "mini-frac" to determine the magnitude of the least principal stress, and re-completing the well in preparation for hydraulic stimulation in Phase II. In addition, numerical modeling has been undertaken to estimate heat recovery and make generation forecasts for various stimulated volumes and well configurations.

The target formations for hydraulic stimulation in well DP 23-1 lie below an unstable phyllite which bottoms at about 1,740 m (5,700 feet). The formations beneath this unit include a section of Jurassic/Triassic metamorphic rocks (of which the phyllite is a part) and an underlying, younger (Cretaceous?), massive granodiorite that intrudes the older rocks above. This granodiorite unit extends from 2,140 m (7,020 feet) to TD (2,939 m or 9,641 feet) in DP 23-1 and is likely to have considerable lateral extent.

A wellbore image log obtained over a significant portion of the open hole has been analyzed in terms of the distribution and orientation of natural fractures and borehole failure phenomena (tensile fractures and breakouts). The features analyzed from the image log have been used to evaluate the orientation of the stress field and constrain the magnitudes of the principal stresses. These analyses permit an evaluation of the effects of pore pressure increase on preexisting fractures, and, in conjunction with lithology, mineralogy, drilling rate and geophysical log data, have been used to identify the most prospective interval for stimulation.

Work remaining to be completed in Phase I includes the "mini-frac" and re-completion of well DP 23-1 in preparation for hydraulic stimulation. Future plans for the project in Phase II focus on planning, conducting, monitoring and evaluating a massive hydraulic stimulation of well DP 23-1. Should the stimulation result in the creation of a large enough reservoir, a second and perhaps a third well would be drilled and stimulated, and the system would be tested for several months to determine its capacity. In Phase III, a 2-5 MW stand-alone binary power plant would be designed and constructed at Desert Peak East, and in Phase IV, the power would be either sold to a utility customer or used to supply the parasitic power needs of the existing Desert Peak hydrothermal power plant.

A recent additional focus of the project involves evaluating the feasibility of stimulating a non-commercial well drilled in the hydrothermal portion of the field (DP 27-15).

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