

Feasibility Evaluation of an “In-Field” EGS Project at Desert Peak, Nevada

Ezra Zemach¹, Peter Drakos¹ and Ann Robertson-Tait²

¹ Ormat Nevada, Inc., Reno, Nevada, USA

² GeothermEx, Inc., Richmond, California, USA

Keywords: Desert Peak, Enhanced Geothermal Systems, EGS, Hot Dry Rock, HDR, binary power plant, Organic Rankine Cycle, ORC, Ormat Energy Converter, OEC

Abstract

Desert Peak well 27-15 was selected to evaluate the feasibility of EGS development in the Basin and Range geologic province. The 27-15 well is located immediately north of the operating conventional geothermal reservoir at Desert Peak and has favorable temperatures and rock units that are amenable to hydraulic stimulation, providing an excellent opportunity to enhance permeability and directly observe the results. During the second half of 2008 and first month of 2009, a series of technical analyses were undertaken to confirm the viability of well 27-15 for EGS stimulation. These analyses include analyzing cuttings from other wells in the field to better understand stratigraphic relationships, evaluating data from a wellbore image log and other logs, pressure transient testing, tracer testing, completing a reflection seismic survey, and developing a conceptual model of the geologic structure that is consistent with the results of the above and with surface mapping and subsurface geology determined from the existing wells drilled in the field. The results of these analyses have improved the understanding of the geologic and hydraulic relationships between well 27-15 and the productive area of the field to the south.

Three possible stimulation intervals have been considered: 1) between 3,000 and 3,300 (stimulating a silicified zone at the base of the Tertiary Rhyolite Unit); 2) between 4,500 and 5,300 feet (exploiting a zone of natural but limited permeability near the boundary between the upper and lower pre-Tertiary rock units); and 3) stimulating the deeper intrusive units within the lower pre-Tertiary unit near the bottom of the well. The results of the analyses described above indicate that while there are permeable fractures that appear to be optimally oriented for shear with increased pore pressure in all intervals considered, connecting well 27-15 to the hydrothermal portion of the reservoir can probably be achieved most reliably by stimulating the base of the Rhyolite Unit. This will be attempted later in 2009, following a re-completion of the well and a “mini-frac” to enable the magnitude of the minimum horizontal stress to be estimated.

[For a copy of this paper please e-mail us at mw@geothermex.com](mailto:mw@geothermex.com)