

UTILITY OF THE DATA GATHERED FROM THE FENTON HILL PROJECT FOR DEVELOPMENT OF ENHANCED GEOTHERMAL SYSTEMS

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ABSTRACT

To prioritize information for archiving and to determine the applicability of the Fenton Hill experience to the future development of Enhanced Geothermal Systems (EGS), an integrated review was made of five categories of Fenton Hill information: hydraulic fracturing data, well logs, seismic data, flow test data and tracer test data. Major experiments were identified, the methods of data collection and analysis were determined, the location and format of the data were determined, and further analyses that would yield information of value to EGS developers were suggested. Such analyses would be directed toward the determination of: 1) if and how the state of stress in the reservoir changed during sequential fracturing jobs; 2) how the orientation of fractures changed with depth and location; 3) how the reservoir size increased as fracturing and flow testing operations proceeded; 4) how the hydraulic properties and heat-transfer characteristics of the reservoir varied with changes in operating conditions; and 5) how the Phase II reservoir (the deeper and hotter of the two reservoirs developed) would behave over the long term under various operating conditions.

By archiving and analyzing certain data, the Fenton Hill experience could be used to guide effective hydraulic fracturing operations, collection of seismic data for reservoir mapping, and well logging programs. A numerical model of the Fenton Hill system, derived from a carefully considered conceptual model of the reservoir and fully calibrated against existing test data, could be used to develop guidelines for optimizing production from an EGS reservoir using various production/injection schemes. These types of evaluations would necessarily integrate all five categories of data mentioned above to extract information relevant to EGS reservoir behavior, particularly for systems developed in crystalline rock. In this way, the resolution of important unanswered question about the nature of the Fenton Hill system could be used to reduce the cost and improve the success rate of EGS development elsewhere.

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