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DEVELOPMENT OF A LOW-TEMPERATURE HYDROTHERMAL ENERGY RESOURCE Order No. DA8302099

GOLDMAN, DENNIS, PH.D. *University of Idaho*, 1982. 322pp.

A hydrogeologic development strategy is presented for the development of low-temperature hydrothermal energy based on an in-depth study of low-temperature case histories and other select geothermal developments. The strategy is in the form of decision trees for site selection and exploration, drilling, and testing of fault-controlled systems. The strategy also addressed problems specific to low-temperature hydrothermal development and presents differences in equipment and techniques used in other industries.

The site selection and exploration strategies are based on a balanced mixture of geologic, geochemical, geophysical, hydrological, and drilling practices and techniques. Selection of a general site for exploration is recommended on the basis of evidence of a geothermal resource, not on the location of its intended end-use.

Exploration of a specific site is based on the understanding of geologic structures. The approach proposed in this study involves the formulation of target models and the constant updating of these models during exploration. Geophysical techniques are presented in order of preference for exploring low-temperature, fault-controlled systems.

The drilling strategy is based on the use of drilling techniques currently acceptable in other industries. The scheme involves the formulation of preliminary drilling plans and the continual updating of these plans as the drilling proceeds. Methods of well construction, the importance of well development, and types of drill fluids are examined in this report. The type and quality of data that should be collected during drilling are recommended.

The testing and analysis strategy is based on the use of techniques currently acceptable in other industries. However, thermal energy is a property of the fluid rather than the fluid itself. Determination of well type, reservoir type, and whether the test will utilize a pump is required when following the testing strategy. The type and duration of testing, the fluid discharge rate, the type and measurements of field data to be measured, and a technique for analyzing a thermal well test are recommended. Discussion of test data analysis includes not only the thermal problems, but the reservoir