

Dealing with Geologic Uncertainties in Drilling Geothermal Wells: A Case History from the Azores

Rui Pedro Lavrador Martins Cabeças¹ and Roger Henneberger²

¹Sociedade Geotérmica dos Açores, S.A. Rua Eng. José Cordeiro n° 6 9504-535

Ponta Delgada, Açores, Portugal

²GeothermEx, Inc., 5221 Central Avenue, Suite 201, Richmond, California 94804-5829 USA

Key Words:

Azores, Portugal, São Miguel, Ribeira Grande, Pico Vermelho, geology, volcanology, drilling

ABSTRACT

Two new production wells drilled on the island of São Miguel by Sociedade Geotérmica dos Açores during 1999-2000 illustrate many of the limitations on the interpretation and use of subsurface geologic information that are commonly encountered when drilling geothermal wells. These limitations include: incomplete sampling due to the drilling methods employed; differences in reporting and interpretation from well to well; irregularities in the shape and extent of many volcanic deposits; correlation difficulties resulting from monotonous volcanic lithologies; and uncertain relationships between geologic factors and reservoir conditions. These limitations must be acknowledged in a wellsite geology program, but their negative impacts on drilling outcomes and costs can be minimized by the integrated use of all available data, and close coordination with personnel responsible for supervision and execution of the drilling. This can also offset the need to employ drilling and logging methods that may be costly or impractical in remote settings. Despite the uncertainties, information obtained from the new São Miguel wells has helped improve the understanding of the volcanic structure of the area, and of the geologic characteristics of the geothermal system.

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