

Detection of Seepage by Geothermal Techniques¹

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ABSTRACT

A new field method has been developed by Geothermal Surveys, Inc., and has been applied throughout the past five years for detecting zones of reservoir leakage through retaining dikes and dams. Thermal sensors are emplaced at specific depths and spacing, and temperatures are recorded. Anomalous temperatures are identified after removing the effects of diurnal, extra-diurnal, and seasonal variation, the effects of lithologic differences, structure, and other special conditions. More than one set of observations is made in order to distinguish between the effects of connate and moving water. The method has been successfully applied within the San Francisco Bay (San Pablo Bay) system of the Leslie Salt Company and in earth dam studies in Los Angeles County. The technique has been developed to the semiquantitative stage, and research in further quantization is in process. Permanent thermal sensing installations can be made in order to monitor changing seepage conditions as they develop. Patent applications on the methods and apparatus are under prosecution.

¹Paper not available for publication.