ABSTRACT

CHEMICAL RESPONSE OF THE WAIRAKEI GEOTHERMAL FIELD TO EXPLOITATION

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Geochemical data for production wells and natural discharges at Wairakei have been compiled for the period 1950 to 1981. Data from the pre- and early exploitation phase suffer from the absence of well-developed sampling and analysis techniques, but may be used to provide a base model for the undisturbed chemical structure of the field.

Major chemical changes occurred during the first stage of exploitation (to mid 1960s) due to widescale boiling in the production field. Dilution by surficial waters dominates the later stage of exploitation. Although useful for individual production wells, the silica geothermometer is too responsive to local production-induced boiling to provide a definitive model of gross changes in the field. Differences between solute geothennometers coupled with changes in chloride concentration may, however, be used to provide a quantitative model of field response for use in field management. The chemical model may also be used for quantitative assessment of the effects of reinjection where alternative models based on physical measurements alone are largely inadequate.