

# FORECASTING WELL AND RESERVOIR BEHAVIOR USING NUMERICAL SIMULATION, UENOTAI GEOTHERMAL FIELD, AKITA PREFECTURE, JAPAN

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## **ABSTRACT**

The purpose of this paper is to describe how numerical simulation was used to forecast the behavior of the reservoir and individual wells in order to estimate the development potential of the field and to optimize a 30 MW development at the Uenotai geothermal field in Japan. The numerical simulation model developed was a three-dimensional, two-phase, integrated finite-difference model. The model was calibrated, by trial and error, in two stages: (1) by matching the initial-state of the field, and (2) by matching the pressure and enthalpy transient histories from a number of wells. The behavior of the reservoir under various assumed production/injection scenarios was forecast by the calibrated model. A numerical borehole simulator was used to generate a set of inflow performance (IFP) curves for each well. The flowing wellbore pressure was calculated from the reservoir pressure forecast by the model using the pseudo-steady state flow equation.

From the model forecasts, IFP curves and the calculated wellbore pressures, it was concluded that a 30 MW development is feasible with the drilling of two additional production wells and two make-up wells during the 30 year life, plus two new injection wells.

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