

## Accepted Manuscript

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PII: S0894-1777(17)30017-1  
DOI: <http://dx.doi.org/10.1016/j.expthermflusci.2017.01.017>  
Reference: ETF 8996

To appear in: *Experimental Thermal and Fluid Science*

Received Date: 17 August 2016  
Revised Date: 27 November 2016  
Accepted Date: 17 January 2017

Please cite this article as: M.J. Khasani, S. Jalilinasrabady, T. Tanaka, H. Fujii, R. Itoi, The study on transient behaviors of two-phase flow in a geothermal production well for a short period of continuous measurement, *Experimental Thermal and Fluid Science* (2017), doi: <http://dx.doi.org/10.1016/j.expthermflusci.2017.01.017>

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## The study on transient behaviors of two-phase flow in a geothermal production well for a short period of continuous measurement

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### ABSTRACT

Deliverability of geothermal production wells is evaluated by measuring wellhead pressure versus mass flow rate at several wellhead pressures. Controlling a main valve of the well results in the changes in wellhead pressure and mass flow rate. However, duration required for these variables to stabilize depends on flowing behavior of steam-water two-phase fluid in the wellbore. Fluid stabilization seems to be an important parameter, mainly for short period of measurement. In addition, the manner of controlling valve operation whether it starts from the well in full-closed condition or in full-opened condition seems to affect this flow stabilization. Thus, the experiment was carried out for a production well 2H-21 at Hatchobaru geothermal field, Japan to verify these hypotheses. The measurement apparatus consisted of pressure sensors, water level sensor and a PC to store the measured data. The data were recorded every second for the pressures at upstream of the orifices, the pressure drops at the orifices, the pressures at the separators, and the water level at weir box. The degree of valve opening was changed three times during the measurement. Then, the duration of respective wellhead valve operation for controlling flow rate affecting the flow stabilization in wellbore was observed. It was found that quick valve operation caused longer period for stabilization and produced impulse response of flow rate soon after the valve operation stopped. The fluid flow required about 7 min to stabilize for closing valve operation whereas it needed longer than 20 min to reach the stable condition for opening valve operation. After changing the wellhead pressure, the steam flow rate stabilized

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