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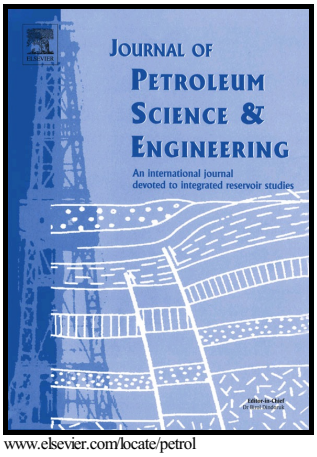

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Two-phase Flow Characterization in a Split Vane Impeller Electrical Submersible Pump

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ABSTRAC

Electrical Submersible Pumps (ESPs) are used in the upstream petroleum industry for pumping liquid-gas mixtures. The presence of gas in the flow reduces the efficiency of ESPs. To investigate the effect of gas in the flow medium, Electrical Resistance Tomography (ERT) and pressure measurements were utilized on the diffuser stages in a 3-stage split-vane ESP. In an ERT system, the relative conductivity of the fluid mixture is measured which is used to obtain the gas concentration. The measured local gas concentration and gas volume fraction (GVF) were used to characterize the flow for different water and air flow rates, inlet pressures and rotating speeds.

Keywords: ESP; Multiphase; Slip Velocity; Void Fraction; Electrical Impedance Tomography; Performance Scaling

NOMENCLATURE

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