
 Journal of
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ONLINE ISSN : 1881-4131

PRINT ISSN : 0370-9868

Journal of the Japanese Association for Petroleum Technology

Vol. 70 (2005) , No. 6 pp.537-544

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Multiphase flow meter for intensive water cut monitoring in Abu Dhabi

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(Received August 31, 2005)

(Accepted November 11, 2005)

Abstract: Vertical sweep efficiency in heterogeneous carbonate reservoirs is one of the largest uncertainties of the reservoir management for five-spot-pattern water flooding in Abu Dhabi. Intensive water cut monitoring at the producing wells is the key element to optimize reservoir management by water flooding operation in this field. Installation of multiphase flow meters (MPFMs) may enable to provide the operators with continuous and real-time water cut data. Then the two sets of the JOGMEC/OVAL MPFM were installed and commissioned in a giant oil field in Abu Dhabi, and the monitoring of well streams was conducted from August 2002 to December 2004.

The MPFM incorporates a new turbine system consisting of twin-rotors with conventional technologies, while eliminating expensive gamma ray densitometry and minimizing the size, thus successfully achieving great cost reduction and easy installation.

The MPFMs custom-made for the liquid production range of 5,300-8,100 BLPD continuously measured oil and gas rates within +/-10% relative error and water cut within +/-3% error. The high accuracy of the MPFM monitoring liquid and gas rate was confirmed by the referential test separator data. However further confirmation is required for water cut monitoring by MPFMs, because enough referential sampling data were not available for comparison of water cut. On the other hand, it was confirmed that the accuracy of the reference data directly affects the water cut. Therefore, more samples of accurate reference data are indispensable for good result of MPFM monitoring and also the MPFM needs to take measures for reducing the error of the water cut.

It was learned from the experience of this field trial that the most important point for the improvement of any MPFM is for MPFM vendors and operators to confirm the ability of

MPFMs with using “the accurate reference data” in the same fields. It will enable operators to confirm the true ability of MPFMs in the fields and use MPFMs as a reliable reservoir-monitoring tool for better reservoir management.

Key words: [Multi phase flow meter](#), [Turbine](#), [MPFM](#), [Water cut monitoring](#)

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To cite this article:

Tomoko Watanabe 2005: Multiphase flow meter for intensive water cut monitoring in Abu Dhabi , J. JAPANESE. ASSOC. PETROL. TECHNOL., **70**: 6, 537-544 .

doi:10.3720/japt.70.537

JOI JST.JSTAGE/japt/70.537

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