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| Please fill in your 5-digit IPTC manuscript number. | IPTC-22923-Abstract |
| Please fill in your manuscript title. | Development of an Automated and Compact Multi-phase Well Test Metering System |

Please fill in your author name(s) and company affiliation.


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# Abstract

**Objectives/ Scope:**
The design, development and testing of a compact multi-phase well testing system in reported here that can accurately process high Gas/Oil ratio (GOR) feeds in order to test the productivity of individual oil wells. Such conditions pose a challenge for traditional multiphase meters & well testers and compact separation of the phases fills an important technology gap in handling high GOR wells.

**Methods, Procedures, Process:**
The system comprises a unique cyclone technology for primary separation of gas and liquid as well as Coriolis meters for accurate measurement of liquid and gas flow rate from any well which fits the operation envelope of the system. The liquid exiting through the bottom outlet of the cyclone flows to a horizontal degassing pipe section for additional degassing of the liquid. The degassed liquid passes through a high accuracy Coriolis meter to measure the bulk liquid density and mass flow. Downstream of the Coriolis meter, a water-cut meter measures the volumetric fraction of water. The main gas flow, after being recombined with the gas exiting the liquid degassing boot, is likewise measured by a high accuracy Coriolis meter. The mobile and modular well testing unit fits in a shipping container and could be deployed to process feed streams with wide GOR and water-cuts across a range of pressures and temperatures. Prior to the process design and experimental testing, an Eulerian Gas-Liquid CFD simulation was performed in order to evaluate and predict the liquid gravity knock-out of the multi-phase well test metering system.

**Results, Observations, Conclusions:**
The CFD simulation confirmed that the process design of the compact multi-phase wall test system reported herein was able to operate effectively at challenging flow conditions and to separate gas and liquid components to a degree at which accurate measurement was possible. The designed compact multi-phase wall test system was then successfully tested in both laboratory and field conditions.

**Novel/ Additive Information:**
This innovative technology enables the effective assessment of the productivity of individual wells within a large oil field, which leads to a more effective well monitoring and better overall reservoir management and cost savings.