

Micro Motion Coriolis meters accurately detect and quantify wellbore ballooning

RESULTS

- Identification and quantification of wellbore ballooning
- Improved flow trend analysis to distinguish wellbore ballooning from kicks during connection
- Enhanced decision making when selecting an optimal mud weight



CUSTOMER

Managed Pressure Operations (MPO) provides systems for managed pressure drilling and continuous circulating systems to the oil and gas drilling industry. MPO has operations in Brazil, the Middle East and Asia Pacific, and offices in the USA (Houston), Indonesia (Jakarta), Dubai and Singapore.

APPLICATION

Managed Pressure Drilling (MPD) is a drilling process used in potentially difficult to drill wells where the likelihood for kicks is high. This drilling technique allows better and more precise control of the Bottom Hole Pressure (BHP) by use of a closed and pressurised drilling fluids system.

CHALLENGE

In a typical deep-water drilling operation, the static mud weight used is always near the fracture opening pressure of the formation because it becomes less compact the deeper the water is between the drill ship or platform and the actual well bore. During circulation, the Equivalent Circulating Density (ECD) exerted by the mud can exceed the fracture opening pressure. Considering that the ECD is greater than the fracture opening pressure, while the static mud weight is below the fracture closure pressure, small cracks in the wellbore side occur and drilling mud spills away. Often the less dense fluid parts of the mud first, likely to increase the mud density on the return flow rate. As the mud loss occurs while circulating, this fluid releases and is inserted back in the wellbore as the pumps are stopped for example, for making a connection. The fractures are closing again and the mud is pushed out into the wellbore. The volume increases which can be misinterpreted as a kick during connection while it actually is ballooning.

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Micro Motion ELITE High Capacity Meter



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The normal corrective action would be to increase the mud weight. If this is done, as a result of confusion, the magnitude of the problem will be escalated and cause significant non-productive time.

SOLUTION

Micro Motion® Coriolis ELITE® mass and density flowmeters, have a unique geometry that keeps the return fluid within the return line very stable, enabling very accurate readings of mass, density, volume and temperature from one sensor. Coriolis flowmeters measure mass and density directly from the process fluid. In the case of drilling mud, which is a multi-phase fluid, the accurate reading of the fluid proves itself to be best when the fluid is kept as stable as possible in the flowmeter, allowing for a much more accurate reading over a much wider flow range. It also allows handling of gas entrainment in the fluid to translate in a change of density.

MPD provides an enclosed wellbore solution in which an accurate flow reading provided by the Micro Motion Coriolis meter, allows for ballooning identification and quantification through flow back characterisation in case a pump is shut-off.

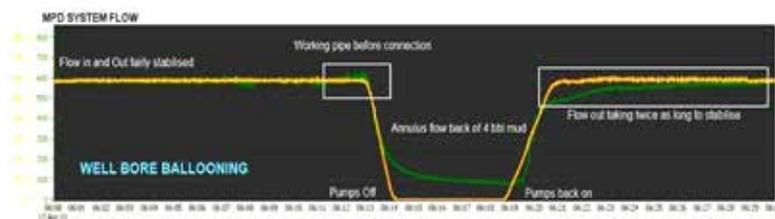
Emerson’s Micro Motion Coriolis flowmeters provide reliable and highly accurate solutions for mass, density, viscosity, volume, and temperature measurement. The technology has been adopted in a wide range of industry applications. MPD solution providers use the Micro Motion ELITE High Capacity sensors in their demanding applications to increase the benefits.

MPO Total Control Driller is designed to follow accurate bottom hole pressure control, to +/- 20 psi, when used with the MPO Non Stop Driller System. The Advanced Predictive Driller kick prevention and loss anticipation system is available with MPO Total Control Driller Plus and the 6" large bore PCVs significantly reduce the risk of plugging compared to smaller bore choke manifolds.

MPO Total Control Driller also features linear pressure control, with a more rapid response than standard MPD chokes. The MPO Control and Data Acquisition System is one of the most advanced on the MPD Market, Dual Coriolis meters can be provided where required and an 8" Coriolis mass flowmeter can be installed for top hole sections and on floating MODU’s with circulation including riser booster pump injection up to 1700 gpm. The TCD manifold 4" Coriolis meter is utilised for lower hole sections with reduced flow rates.



Micro Motion Coriolis High Capacity sensor installed after the choke



Time lapse system showing flow in & out



Offshore MPO’s MPD installation

