

Micro Motion® Coriolis Meters Improve Safety and Efficiency of Drilling Process with Enhanced Kick Detection

BENEFITS

- Improved safety through enhanced influx detection of formation fluids
- Reduced non-productive time (NPT) of the oil rig
- Lower operating costs with the elimination of manual sampling and the use of nuclear technology



APPLICATION

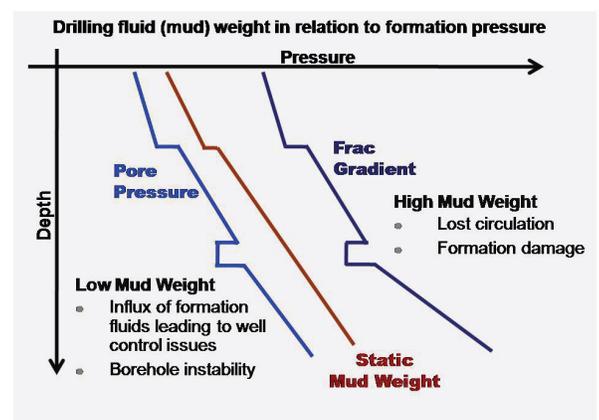
Oilfield Services – Drilling Fluid Management – Kick Detection

During the drilling process, drilling fluid (mud) is taken from the storage pit and pumped down the drill string and returned to the surface for treatment and reuse. The drilling fluid has many functions, such as cooling the bit, removing the cuttings, and stabilizing the well bore. Also, maintaining the proper density of the drilling fluid plays an important role in managing downhole pressure against the pressures being exerted by fluids in the formation (pore pressure) and the pressure at which the formation will crack (frac gradient) and allow drilling fluid to flow into the formation.

CHALLENGE

The influx of small quantities of formation fluids (such as oil, water, and gas) into the drilling fluid can reduce the density of the drilling mud which leads to an increased influx rate and the potential for a well-control event or kick. A kick, if not recognized and controlled properly, can lead to many hours of non-productive time (NPT) of the oil rig or a catastrophic event, such as a blowout. Monitoring the density of the drilling fluid returns in reference to the downhole fluid density can provide a means for the early detection of small influx situations. Density measurements are typically done through manual sampling and analysis by the operations personnel. This manual process is subject to operator error and the ability to regularly test the drilling and downhole fluids. Nuclear density meters used to provide continuous density measurements require special handling, transportation, safety training, and licensing.

www.micromotion.com



This graph illustrates the effects of the drilling fluid (mud) weight in relation to formation pressure



For more information:
www.EmersonProcess.com/solutions/oilgas
www.micromotion.com



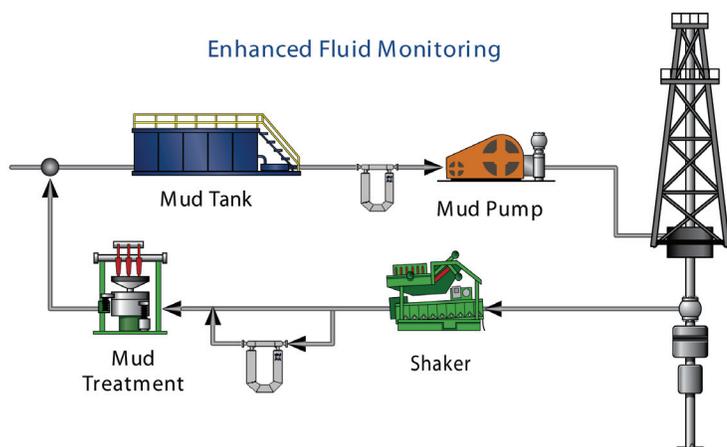
SOLUTION

To improve the detection of formation fluid influx, a major operating company installed Micro Motion Coriolis flow meters on the suction side of the mud pump and on a slip stream after the shaker. This provided a continuous, full stream density measurement of the drilling fluid going downhole along with a continuous density measurement of the drilling fluid returns.

The company chose to install the Micro Motion Coriolis meter for the following reasons:

- Provides an accurate and continuous density, mass, and volume measurement
- Can measure density of water, oil, or synthetic drilling fluids
- Is proven in applications involving dense slurries that contain sand and cuttings
- Is not a nuclear technology

The continuous, reliable and sustained density measurements provide the means for the enhanced detection of the influx of formation fluids in advance of a well-control event. Avoiding these kicks reduces non-productive time of the rig and improves safety. Using a non-nuclear technology also eliminates added operational costs associated with nuclear sources.



An example of enhanced fluid monitoring, showing the placement of a Coriolis meter installed in a slipstream after the shaker and at the suction side of the mud pump