Early kick detection saves lives

Monitoring of mud flow IN and OUT, mud density, and temperature are key parameters that help operators maintain complete oversight over their well control.

Adrilltech install dedicated software and highly accurate flowmeters to provide early alert of delta flow variation and measured pump efficiency, and thereby confident full-well hydraulics measurement required in challenging operating environments.

This capability is particularly valuable for precise flow monitoring when used in combination with the Adrilltech Non Stop Driller (NSD) service.

• Early intervention on mud influx and losses in real-time thereby minimizing non-productive time (NPT) associated with managing a large volume of gas at surface.
• Clear alerts for Driller, Company Man, Toolpusher for swift decision making supported by Adrilltech personnel.
• Accurate, continuous real-time flow, density and temperature readings; minor flow fluctuations as low as 10 l/min can be detected with this service.

• A great deal of value to be added at the rig site for monitoring the difference between flow-in and flow-out. This Delta Flow measurement gives us a trend which can be monitored closely.
• Should a divergence in the trend be measured, meaning that flow out is increasing while flow in remains constant, then this is the first indication that the well is taking a kick. The driller can act immediately to shut in the well, monitor and manage the kick. Similarly, should flow out reduce while flow in remains constant then the well is taking fluid or losing. These losses must be managed to prevent a reduction in the hydrostatic column leading to a reduction in pressure on the wellbore and subsequent kick or influx.
• Historically, and even in many instances at the rig site today we still rely on the indirect measurement of flow-in with pump stroke counters rather than choose a flowmeter because its costly and no more accurate. These indirect measurements are subject to human calculator errors.

• Indirectly - calculated from pump strokes
• Directly measured - Flowmeter

ΔFlow = Flow OUT - Flow IN

ΔFlow > 0 → GAIN → Kick Detection → SAFETY ISSUE

ΔFlow < 0 → LOSS → Lost Circulation → SAFETY ISSUE

Benefits

Applications

KickAlarm service provides clients with dedicated crew personnel, equipment and software to monitor and mitigate well control incidents. KickAlarm can be deployed onshore and offshore, with oil based or water-based muds, supporting critical ECD control, including with NSD applications for collaborative decision making at rigsite or remotely.

KickAlarm has been effectively deployed on more than 200 wells in 30 countries around the world, onshore and offshore, including Brazil, Algeria, Italy, Russia, Norway, South Africa, Angola and France.
A kick was identified using the KickAlarm service at event "A" (red curve spike). The field specialists were able to identify 0.16m³ of gains in a 35 second time interval. As a result, action was taken to mitigate the effects of this kick during the early stages.

Within 8 minutes the well was closed and a total gain of 1.54 m³ was recorded (B). This rapid identification of a kick prevented further problems at the rig and minimized NPT.

Specifications

<table>
<thead>
<tr>
<th>Coriolis</th>
<th>EM</th>
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<tbody>
<tr>
<td>Measured Variables</td>
<td>Mass Flow, Volume Flow, Temperature, Density</td>
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<tr>
<td>Flow Rate Range</td>
<td>0-36,000 Kg/min</td>
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<tr>
<td>Flow Accuracy</td>
<td>+/- 0.1%</td>
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<td>Safety</td>
<td>ATEX, EN</td>
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