

Black Diamond Mud AI Fluid Intelligence

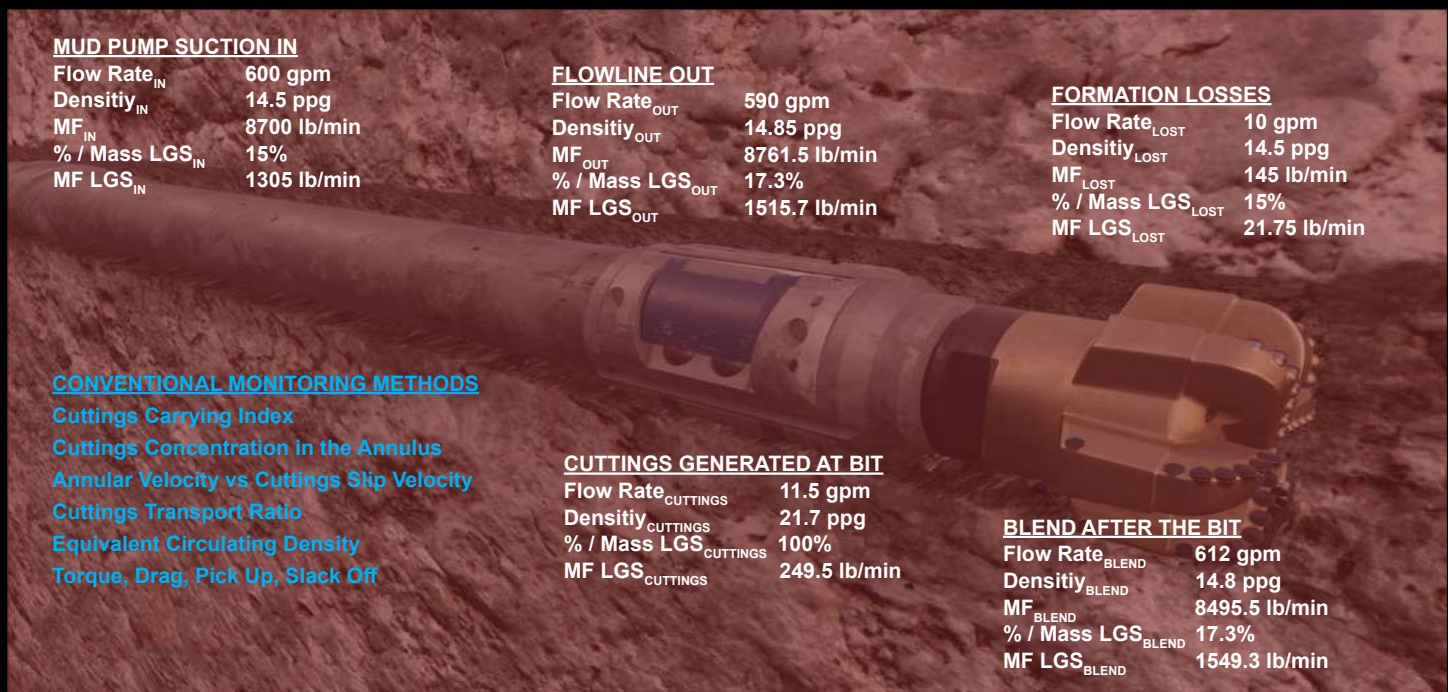


Hole Cleaning Monitoring System

Redefine your well delivery process with our low cost, easy installation, practical **Hole Cleaning Monitoring Solution**. Utilizing the conventional flow paddle and mud pump stroke counter already installed on the rig, coupled with our real time drilling fluid density measurements going in and out of the well enables the computation of a **Compositional Material Mass Balance** on all drilled solids being circulated in & out of the well in real time.

Based on first principles, the law of conservation of mass applies to all drilled solids being added to, and removed from, the total circulatory system. Having clear visibility of this data helps optimize the rate of penetration, casing running operations, directional drilling control, torque & drag management, standpipe pressures and equivalent circulating density.

Our pioneering hole cleaning monitoring system provides accurate, reliable, real-time hole cleaning efficiency data.



FEATURES

- Utilizes innovative technology to measure density/LGS in & out of the well in real time.
- Provides continuous readings throughout the drilling process, 1 Hz data updates.
- Enables proactive adjustments to optimize hole cleaning efficiency.
- State-of-the-art mass balance algorithm compensates for gas cut as well as drilling fluid compressibility.

BENEFITS

- Measure the mass/volume of drilled solids being removed from the well in real time.
- Quantify the mass/volume of solids removed on bottoms up.
- Compute the effectiveness of a sweep using empirical data.
- Mass balance data used in waste management.
- Plot new mass balance data against conventional hole cleaning methods.

PBD & SSE Sensors

Enhance your well delivery workflows with our radically simple mass flow measurement exiting the well – Possum Belly (PBD) & Shale Shaker Effluent (SSE) Sensor Solution.

The system optimizes two drilling fluids components by defining flow rate & density exiting the well in real time. The flow rate component has a unique algorithm applied to the conventional flow paddle data stream that converts the % indication of flow into a volumetric flow rate in real time.

The PBD sensor provides real time density at the flowline, exiting the well, compensated for gas.

The SSE allows determination of solids removal efficiency

Together, the system delivers precise determination of mass flow out of the well in real time, empowering drilling operations with real time empirical data driving informed decision making.

FEATURES



Real Time Density Measurement

Critical for decision making, and plugs into multiple drilling performance algorithms. Used for hole cleaning, wellbore stability, well control, hydraulics modeling, cementing operations, completion fluids, etc.



Volumetric Flow Rate Measurement

Determination of volumetric flow rate, as opposed to traditional % indication of flow exiting the well, allows the use of flow rate as a part of a more sophisticated system of real time monitoring, material mass balance monitoring.



Mass Flow Rate Exiting the Well

Advanced algorithms and calculations establish a comprehensive material mass balance. Allows for determination of all drilling fluid components, compositionally ensuring accurate assessments.

BENEFITS



Hole Cleaning Efficiency

Mass flow measurement of drilling fluids at the flowline quantitatively allows for the determination of drilled solids that have been removed from the well. Quantify the effectiveness of a sweep and determine if it is safe to POOH after just one bottoms up, or if further circulation is required.



Loss Circulation Severity

Mass flow lost to the formation, as a part of filtrate losses, is calculated by subtracting the mass flow out from the mass flow in. The same data can be used to identify ballooning events.






Early Kick Detection

Well control can be a very serious event if not managed properly. There are many human factors that can be augmented with real time flow rate & density data exiting the well in real time. This should be a non-negotiable for every rig in operation.




TPA-SiCon Solution

Redefine your well delivery process with our unique Triple Probe Array (TPA) Simultaneous Concentration (SiCon) Solution. Combining the expertise of your mud engineers with AI and real-time data, our TPA-SiCon system optimizes drilling fluids management workflows. Experience unmatched volume reconciliation, dilution economics, and solids removal efficiency digital supervision. Our cutting-edge **Real-Time Drilling Fluids Density & Low Gravity Solids Measurement** system provides accurate, reliable, and real-time compositional material mass balance, the very foundation to valuable drilling fluid waste management & CO2 emissions monitoring. Empower drilling operations with precision and ease of use, ensuring safe and efficient drilling while meeting environmental compliance.

FEATURES

-  **Real-Time Density Measurement**
Provides continuous 1 Hz frequency readings while drilling. Enables proactive adjustments to optimize drilling performance and avoid potential issues.
-  **Low Gravity Solids (LGS) Monitoring**
Computes drilling fluid LGS in real-time. Facilitates the management and control of drilling fluid composition. Helps prevent drilling complications associated with excessive LGS.
-  **Compositional Material Mass Balance**
Tracks the inflow and outflow of drilling fluid components, ensuring accurate assessments. Applies advanced algorithms and calculations to establish a comprehensive material mass balance. Supports drilling engineers in making data-driven decisions to enhance drilling efficiency.

BENEFITS

-  **Lower Diesel Consumption**
Base oil accounts for more than 50% of the total drilling costs. Digitizing the workflow brings full transparency to the volume of dilution used vs compositional requirements. Drives accurate management of dilution optimization.
-  **Lower Waste Volume Generated**
Minimizing the volume of waste by increasing the solids removal efficiency helps reduce the volume of whole mud replacement needed to optimize the drilling fluids management workflow.
-  **Lower Greenhouse Gas Emissions**
A cleaner mud system means lower energy consumption, fewer trucks hauling waste/ mud products, /diesel for generators, overall reducing the carbon footprint thus contributing to overall environmental stewardship with good ESG Compliance.

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