

DrillClean

Real-Time Monitoring Service for Borehole Cleaning and Stability

DrillClean provides an effective, low cost solution to monitor well bore stability and the effectiveness of cuttings cleanout while drilling, especially in horizontal and extended reach wells. This is accomplished with GEOLOG specialists monitoring and providing feedback to customers through the use of cuttings volume machines deployed at the shakers on the rig. Through this real-time monitoring service, problems with bore hole cleaning and cavings can be solved promptly thereby avoiding additional risks to expensive downhole assemblies.



GEOLOG
SURFACE LOGGING

Benefits

- Reduce risks drilling horizontal or extended reach wells through effective hole cleaning
- Reduce Non Productive time (NPT) by monitoring drilling efficiency and hole cleaning
- Early identification of borehole stability problems
- Tighter controls on ECD and bottom hole pressure in narrow pore pressure margin environments
- Prevent pipe pack-off due to excess cuttings left down hole
- Modify drilling programs and procedures to improve efficiency on subsequent wells

Challenges and Solutions

- Borehole Stability
- Efficient hole cleaning in horizontal and extended reach wells
- Managing narrow ECD margins
- Avoid NPT associated with pack-off of cuttings
- Effective cementing job

- *Real-time cavings detection*
- *Quantitative cuttings volume measurement*
- *Onsite GEOLOG specialist providing alerts and advice*
- *Real-time open hole volume monitoring*

Applications

DrillClean is effective for both offshore and onshore environments, especially in horizontal and extended reach wells. Multiple shakers can be monitored at the same time. Data is capable of being streamed in Real-time via Wellcoms with 24/7 access.

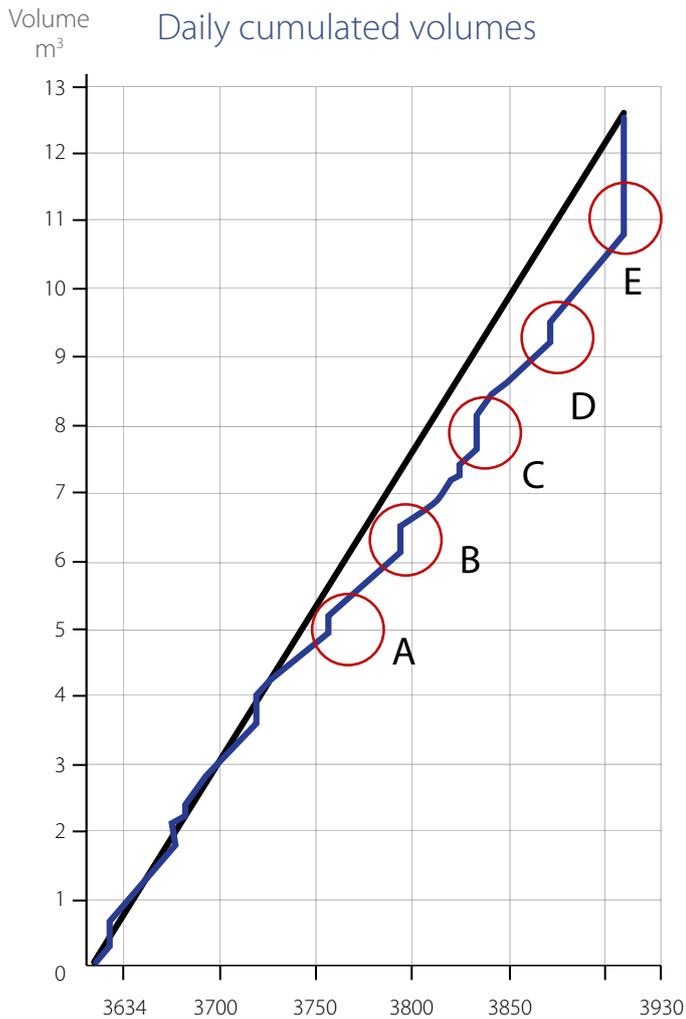
The DrillClean service is compatible with most shaker systems on rigs today with little rig modifications. This service can be run as a stand-alone service or combined with GEOLOG mud logging operations.

Patented GEOLOG technology, DrillClean has been successfully utilized on over 150 wells, onshore and offshore, in several countries in Europe, South America, Africa and Middle East.



Essential for horizontal and extended reach wells.

DrillClean



Drilled from 3634.00 to 3910.00 m

Volume of drilled hole: 12.6 m³
 Volume retrieved cuttings: 12.6 m³
 Missing volume: 0.0 m³

Offshore – Angola

Drilled 8 1/2" Section from 3634 – 3910 m (276m)
 Deviation – Over 40°

From 3,720m the hole cleaning efficiency reduces as the RPM and the flow rate were observed to decrease from 120 to 80 RPM, and from 2,000 to 1,700 l/min respectively. After identifying the accumulation of cuttings with the DrillClean service back reaming was initiated at each stand with ineffective results as shown at points "A", "B", "C", and "D" (as highlighted in red circles). GEOLOG Specialist highlighted that the cuttings were still being accumulated downhole.

A revised hole cleaning procedure was implemented. A HiVis-LowVis Pill was pumped to ensure effective cuttings removal and the results can be seen at point "E". At section TD, the drilling plan called for six (6) bottoms up circulation. DrillClean service was able to determine that the missing cuttings volume was fully recovered with four (4) bottoms up circulations, saving \$150,000 of NPT. The service also prevented potential stuck pipe and formation damage.

— Theoretical Cuttings Volume
 — Measured Cuttings Volume

Figure 1. Daily accumulated volumes of cuttings. Highlighting back reaming at A, B, C, D. With a bottoms up circulation at E.

Specifications

Measurement	Cuttings Weight
Resolution	10 g
Frequency of computation	5 seconds

*dependent on fluid richness of sample

GEOLOG around the World



Technical Paper
References



Cutting Weight Sensors to Improve Drilling Efficiency: Field Results Onshore South Italy.
 (IADC, Dallas, March 2004, Eni)