Drill Clean

GEOLOG

Real-Time Monitoring Service for Borehole Cleaning and Stability

GEOLOG's **DrillClean** provides an effective, low cost solution to monitor well bore stability and the effectiveness of cuttings removal while drilling, especially in high-angle, horizontal and extended reach wells. This is accomplished through the use of cuttings volume machines deployed at the shakers on the rig, sophisticated proprietary software, with GEOLOG specialists monitoring and communicating real-time feedback.

With the DrillClean service challenges of solids loading and hole cleaning are identified and resolved promptly, thereby avoiding serious and expensive well construction Non-Productive time (NPT).

Benefits

- Reduce Non-Productive time (NPT) by monitoring hole cleaning efficiency
- Early identification of borehole instability problems
- Monitor effectiveness of remedial actions: mud rheology, pills/ sweeps, hydraulics and back-reaming/wiper trips
- Improved oversight in narrow pore pressure margin environments
- Prevent pipe pack-off due to excess cuttings left down hole
- Modify drilling programs and procedures to optimise mitigating and remedial actions

Challenges and Solutions

- Borehole instability
- Efficient hole cleaning in horizontal and extended reach wells
- Managing narrow ECD margins
- Avoid NPT associated with solids accumulation
- Effective cementing jobs

- *Quantitative cuttings volume measurement*
- *Sophisticated software converts bulk mass to formation volume*
- *Real-time cavings detection*
- *Onsite GEOLOG specialist providing alerts and advice*

Applications

GEOLOG's DrillClean is effective for both offshore and onshore environments, and considered by many Operators as essential in horizontal and extended reach wells. Multiple shakers can be monitored at the same time.

The DrillClean service is compatible with most shaker systems on rigs today with little rig modification required. This service can be run as a stand-alone service or combined with GEOLOG mud logging operations. Data can be streamed in Real-time via Wellcoms with 24/7 access.

Patented GEOLOG technology, DrillClean is routinely utilized worldwide, having successfully prevented hole-cleaning related NPT on over 200 wells, onshore and offshore.

Essential for horizontal and extended reach wells.

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Case History
$150,000 USD saved using DrillClean service

Daily cumulated volumes
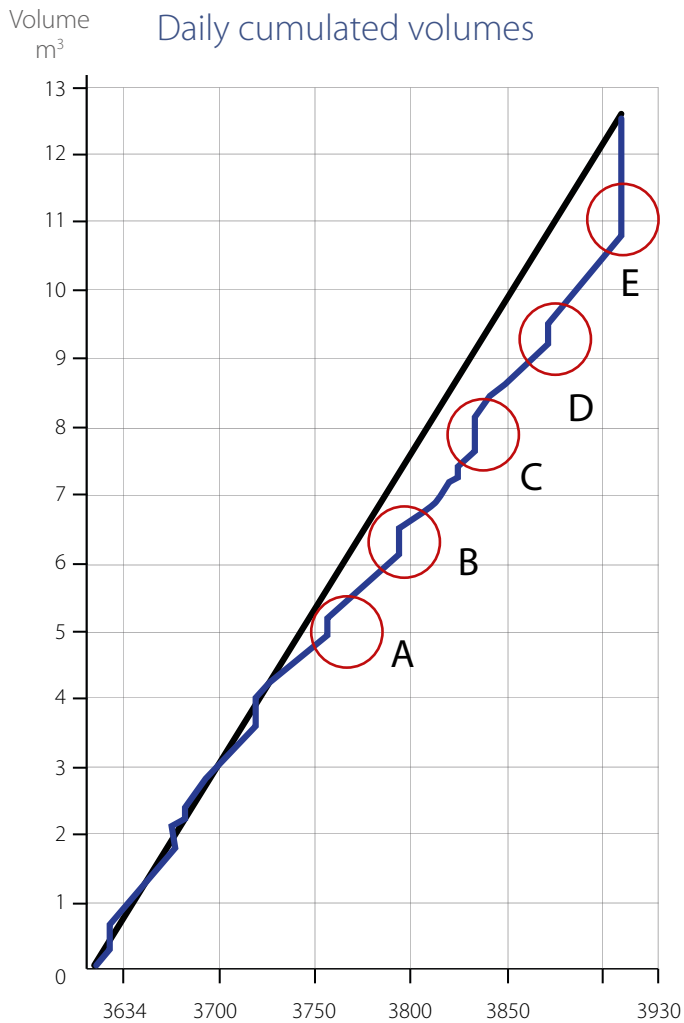
Volume m³

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 ½" 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

Quantifying Hole Cleaning in Real-Time Optimises Drilling Performance and Demonstrably Reduces NPT and ILT in a Complex Multilateral Well
(SPWLA, Bogor, November 2018, Kuwait Oil Company)

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