

To measure in real time the volume of cuttings coming out of the well to prevent Stuck pipes



DrillClean Service

Scales positioned in front of each shale shaker continuously measure in real time the weight of the cuttings coming out of the hole. An engineering software transforms the weights into volume which is graphically displayed on the rig floor. The driller immediately knows what is happening downhole, when cuttings remain in the hole (risk of getting stuck pipes) or when caving occurs.

The driller can initiate remedial actions and see results in real time.

The DrillClean service can be provided

- > With a Mud Logging onsite
- > Standalone with a third party mud logging or an EDR on site

DrillClean applications and benefits

- > Real time detection and measurement of borehole cleaning problems to prevent getting stuck.
- > Real time detection and measurement of borehole stability issues to take immediate remedial actions to prevent / reduce ILT
- > Realtime measurement of open hole volume to give the amount of cement to be used when no caliper available
 - > Drilling large hole sizes or over gauged holes
 - > Horizontal well sections
- > Real time visualization of remedial actions
 - > Pumping of heavy pills
 - > Circulation to remove excess cuttings
 - > Switching from sliding mode to rotary mode when borehole cleaning occurs
- > Optimization of bore hole cleaning practices
- > Can be installed on all rigs and all types of shakers

DrillClean References

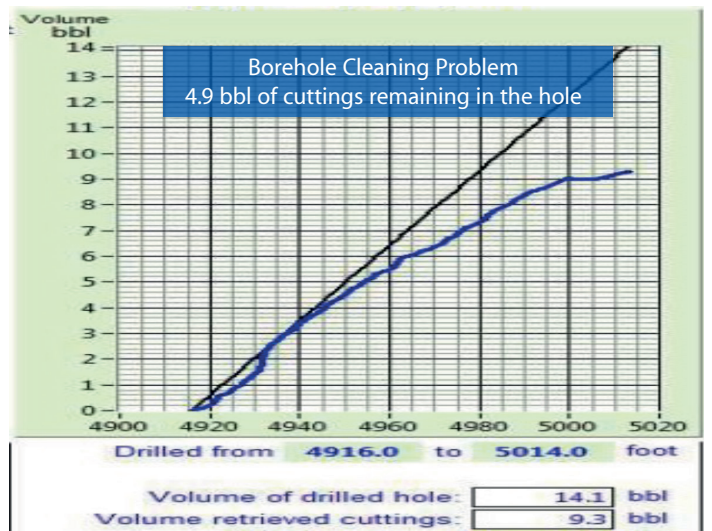
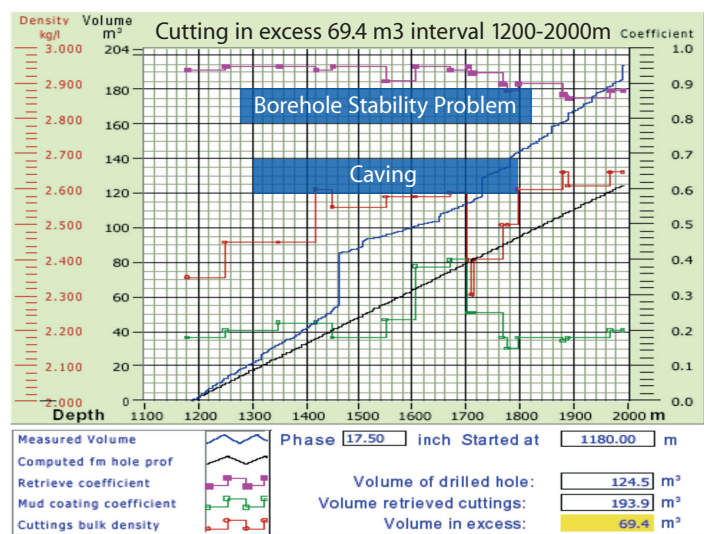
- > **Onshore:** Italy – Turkey – Romania- Holland-Bolivia- Argentina- Kuwait - Libya
- > **Offshore:** North Sea – Angola – Libya- Tunisia – Romania- Italy
- > **Deep water offshore:** Angola- Ghana
- > **Stand alone:** Kuwait - Argentina

How much cuttings



Too Much?

Not Enough?



DrillClean accuracy. Well in Italy

- > Drilling 1,685 m of 12 1/4" hole
- > Expected volume of cuttings 125 m³
- > Volume by 6 arms caliper 154 m³
- > Volume by DrillClean 148 m³
- > Difference 6 m³ (3.6% less)

Based on repeated comparisons with wireline calipers the difference remains less than 5%

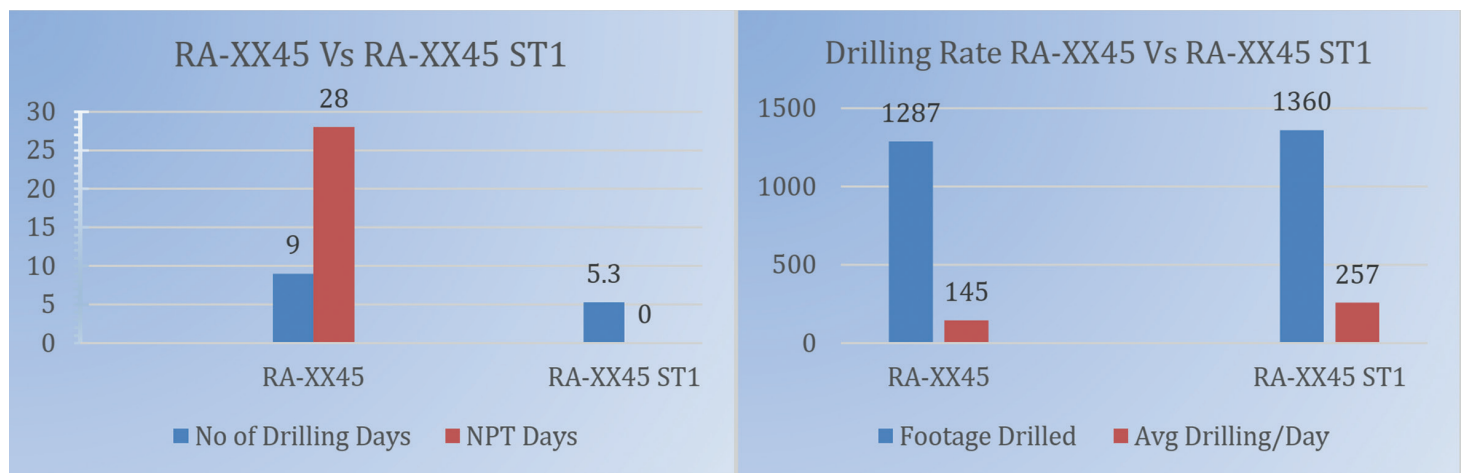
CASE HISTORY
Over 1,000,000 USD saved using the DrillClean service

SPE-209944-MS

Defining Maximum Allowable ROP in Realtime, enhancing the Drilling Performance based on Cutting Recovery Technology in highly deviated wells in Kuwait for KOC.

KOC decided to use the DrillClean service following stuck pipe problems in the challenging wells of Radhuatain field. On well RA-XX45a stuck pipe event occurred close to TD of the 6" section resulting in lost in the hole tools and 28 days of NPT. The operator decided to side track the well and to deal with such challenges using the DrillClean to monitor and identify in real time the hole condition.

The service helped to reduce stuck pipe risks, promptly identifying borehole cleaning issues due to higher ROP at 15544ft TVD. The interval was exactly the same interval where stuck pipe occurred in the original hole -depth 15551 ft TVD. The cutting recovery dropped to 82% compared to the theoretical volume. However the timely recommendations like wash up and ream down with 80 ROM helped the operator to ensure the proper borehole cleaning and successfully drilled the 6" hole section to TD. Even after some partial losses in between due to the narrow pore pressure margin, at final TD the cutting recovered to surface was 93% of the theoretical volume. The figure below shows the comparison between the original hole without the DrillClean (RA-XX45) and the side track with the DrillClean service (RA-XX45 ST1)



As a result the operator was able to drill the wells optimally, saving 3.5 days of rig time and about 50% of the pill volume for each well. The total saving for 5 wells with the service deployed in the 6" production section was USD- 1.075 Million. The solution has been deployed across multiple rigs drilling similar challenging wells.

GEOLOG around
the World



Technical Paper References



Defining Maximum Allowable ROP In Realtime Enhancing Drilling Performance Based On Cutting Recovery Technology In Highly Deviated Wells, (SPE Symposium, Bahrain, March 2022)



Holistic Improvement in Drilling Efficiency Using Real-time Quantative Cuttings Volume Monitoring (IAPG, Buenos Aires, November 2021)



Quantifying Hole Cleaning in Realtime Optimizes Drilling Performance and Demonstrably Reduces NPT and ILT in a Complex Multilateral Well (2nd SPWA Asia Pacific Symposium, Indonesia, November 2018)

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