Using Data Analytics For Evaluating The Role Of Retention Of Oil On Cuttings In Mud Recycling As Top Example For Circular Economy


Abstract

Objectives/Scope: Drilling with oil-based fluids requires the tracking of performance indicators to comply with operational requirements. One of the most important performance indicators is the amount of retained oil in drilled cuttings, known as retention of oil on cuttings (R.O.C.), which is tightly monitored as it may increase treatment and operational costs. The objective of this paper is the analysis of R.O.C. during 9-years period, and all related continuous improvement initiatives implemented in different rigs.

Methods, Procedures, Process: Joint efforts between all concerned parties to collect and analyze data from operations (including cuttings humidity, drilling parameters, hole sizes, solids control equipment, fluid formulations & properties) allowed for continuous improvements that resulted in a significant reduction in R.O.C. and maximization of mud recycling while drilling with oil-based fluids. Information gathered from rig surveys, engineering recommendations, solids control equipment performance optimization, and mechanical efficiency enhancements, was also used to keep drilling fluid properties on target while reducing the R.O.C.

Results, Observations, Conclusions: The retention of oil content of cuttings is defined as the mass of fluid over contaminated cuttings mass, normally expressed as grams of oil adsorbed per kilogram of dry cuttings and it is measured by Retort method. 5,668 R.O.C. data points collected during the study period were analyzed, showing some trends. This work lead to implementation of actions that improved the R.O.C. of drilling operations. Significant reduction in R.O.C. values, minimization of drilling waste, cost-avoidance in additional fresh fluid construction, and maximization of fluid recycling have been achieved over the study period. In addition to reducing the volume of drilling waste and maximizing recycled volume of drilling fluids, the baseline R.O.C. performance was established which may open the door for implementation of best available technologies.

Novel/Additive Information: Measuring and tracking the R.O.C. is key for better understanding on overall mud recycling process, as one of the top examples of circular economy; the magnitude of data over time for drilling rigs can be used to define trends, set new key performance indicators and provide directions for the optimization of solids control equipment, mud formulations and drilling parameters.