

50/50 Oil-Water Ratio Invert Emulsion Drilling Mud Using Vegetable Oil as Continuous Phase

Authors : P. C. Ihenacho, M. Burby, G. G. Nasr, G. C. Enyi

Abstract : Formulation of a low oil-water ratio drilling mud with vegetable oil continuous phase without adversely affecting the mud rheology and stability has been a major challenge. A low oil-water ratio is beneficial in producing low fluid loss which is essential for wellbore stability. This study examined the possibility of 50/50 oil-water ratio invert emulsion drilling mud using a vegetable oil continuous phase. Jatropha oil was used as continuous phase. 12 ml of egg yolk which was separated from the albumen was added as the primary emulsifier additive. The rheological, stability and filtration properties were examined. The plastic viscosity and yield point were found to be 36cp and 17 lb/100 ft² respectively. The electrical stability at 48.9°C was 353v and the 30 minutes fluid loss was 6ml. The results compared favourably with a similar formulation using 70/30 oil - water ratio giving plastic viscosity of 31cp, yield point of 17 lb/100 ft², electrical stability value of 480v and 12ml for the 30 minutes fluid loss. This study indicates that with a good mud composition using guided empiricism, 50/50 oil-water ratio invert emulsion drilling mud is feasible with a vegetable oil continuous phase. The choice of egg yolk as emulsifier additive is for compatibility with the vegetable oil and environmental concern. The high water content with no fluid loss additive will also minimise the cost of mud formulation.

Keywords : environmental compatibility, low cost of mud formulation, low fluid loss, wellbore stability

Conference Title : ICOGPE 2016 : International Conference on Oil, Gas and Petrochemical Engineering

Conference Location : Rome, Italy

Conference Dates : March 21-22, 2016