عنوان مقاله:

Study on Attapulgite as Drilling Fluid Clay Additive in Persian Gulf Seawater

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خلاصه مقاله:

Drilling fluids are a vital part of every successful well construction operation. Water based fluids are used commonly due to better environmental compatibility, lower cost and easier preparation. In offshore drilling, seawater can be used as the basis of water based fluids. Salinity of seawater restricts application of some additives. For example, bentonite settles in saline environments. In this study, a synthetic water is prepared based on Persian Gulf seawater. Bentonite, pre-hydrated bentonite and attapulgite suspensions were developed based on fresh water and prepared synthetic water. Rheological and filtration properties of fluids were tested to check their performance in synthetic seawater. Results of filtration measurements showed a thick mud cake and high filtration volume in pre-hydrated bentonite fluids. In the case of attapulgite, filtration volume of suspensions in synthetic water increased comparing to suspensions in fresh water. However, filtration properties were acceptable. Study on rheological properties revealed that Herschel-Bulkley model can predict rheological properties with a good accuracy. This is the case for suspensions in both fresh and seawaters. Also it was seen that all suspension had a flow behavior index less than ۱, showing their shear thinning character. By increasing clay concentrations, higher consistency index, yield stress and gel strength values were reported. At higher clay concentration a stronger three-dimensional network of clay particles in aqueous environment and consequently a stronger gel structure were formed. Overall, it can be concluded that attapulgite can be used in the saline environment of Persian Gulf seawater.

کلمات کلیدی:

Clay mineral, Drilling Fluid, Filtration, Herschel-Bulkley model