Water-based glycol drilling fluid as an environmentally friendly alternative to oil-based muds

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Abstract

Awareness of the importance of environmental issues has become more and more central to the thinking of the oil industry and regulators in the last decades. The oil and gas industry is focusing more and more attention on selecting alternative safe water-based glycol drilling fluid developments as substitute to environmentally hazardous oil-based muds, as regulations become more restrictive for offshore and land operations, particularly in the Iranian oil fields. Results obtained from the laboratory and field use indicate that glycol type and concentration can be modified to suit a particular drilling application to effectively reduce HTHP fluid loss values, improve shale inhibition, increase lubricity, and reduce differential sticking potential. This paper completely compares water-based glycol muds properties, i.e., rheological, shale inhibition, and fluid loss properties along with environmental acceptance, biodegradability, and economic survey with OBMs. According to composition of glycol mud and percentage of glycol, the water-based glycol mud system is environmental friendly and totally non toxic. In addition, glycol and its copolymers provide improved shale stabilization by minimizing dispersion of water-sensitive shale, improve HPHT and API fluid-loss control, and enhance filter-cake quality and lubricity. Base on studies done the water-based glycol muds are highly economical options in comparison with oil-based muds.

Keywords: Drilling fluid; glycol; environment; Oil-based mud