
CaCl₂ 无土相钻井液体系的现状和发展前景

摘要

现阶段伴随更深入地进行石油勘探和开发，会有越来越多的深井和特殊工艺井，因此开发这些复杂井的难度系数也增加了。以往的含有膨润土的钻井液体系中的粘土细颗粒会渗透到储层中并阻塞了储层岩石中的孔隙，大大降低了钻井速率还污染油气层。所以需要新型钻井液体系解决新的技术问题。

在本论文中，首先为了确定 CaCl₂ 无土相钻井液体系中所需要的提粘切剂、降滤失剂、抑制剂、碱性调节剂等处理剂，反复将 CaCl₂ 无土相钻井液放入不锈钢老化釜中在 150℃、16h 条件下进行老化，并且利用六速旋转粘度计进行测量表观粘度、动切力等流变参数，并进行比较和筛选得出新型的钻井液体系所需要的处理剂。然后利用对比实验以及表观粘度、动切力与处理剂的加量变化曲线确定处理剂的加量。

利用对比实验对新型钻井液体系进行抗温性、滤失性、抗污染性和抑制性等方面的性能评价。得出该钻井液体系各方面性能良好满足要求。

关键词：无土相钻井液；提粘切剂；封堵降滤失剂；性能评价

Abstract

At this stage, with more in-depth oil exploration and development, there will be more and more deep wells and special process wells, so the difficulty coefficient of developing these complex wells has also increased. In the past, clay fine particles in the bentonite-containing drilling fluid system will penetrate into the reservoir and block the pores in the reservoir rock, greatly reducing the drilling rate and polluting the oil and gas reservoir. Therefore, new drilling fluid systems are needed to solve new technical problems.

In this thesis, firstly, in order to determine the additives needed in CaCl_2 soilless phase drilling fluid system, such as viscosity-increasing and shear-reducing agents, filtration-reducing agents, inhibitors, alkaline regulators, etc., CaCl_2 soilless phase drilling fluid is repeatedly put into a stainless steel aging kettle for aging at 150°C for 16 hours, and rheological parameters such as apparent viscosity and dynamic shear force are measured by using a six-speed rotational viscometer, and the additives needed by the new drilling fluid system are obtained through comparison and screening. Then, the dosage of the treatment agent is determined by comparing experiments and curves of apparent viscosity, dynamic shear force and dosage of the treatment agent.

The performance of the new drilling fluid system is evaluated in terms of temperature resistance, fluid loss resistance, pollution resistance and inhibition by contrast experiments. It is concluded that the drilling fluid system has good performance in all aspects and meets the requirements.

Keywords: Soilless drilling fluid; Sticky cutting agent; Plugging fluid loss reducer; rating of merit

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