

K₂CO₃ - AVAGLYCO

Product Combination Improves Bore Hole Stability



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INTRODUCTION

In this case study contains a summary of the performance of the POTASSIUM CARBONATE (K₂CO₃) - AVAGLYCO system. This system was been widely used and successful in Val d'Agri (Southern Apennine, Italy) area. In this area, well depths are typically 4,500-4,700m (MD) and the intermediate sections (17½" and 12¼") are considered the most critical due to hole instability problems. Hole instability is a result of tectonic stress in the crossed formations, the presence of reactive clays, and is directly linked to the time that the hole remains open. This makes it very important to use a mud system that provides the needed inhibition and reduces the hole ageing phenomena.

OBJECTIVES

While drilling the intermediate sections, the main objective was to minimize the risk of hole instability due to hydration of the highly reactive clay formations (Irpine Units) in compliance with environmental constraints.

Mud features should be engineered to obtain high performance in the following areas:

- Obtain maximum rates of penetration
- Ensure maximum hole quality and stability

ACTIONS

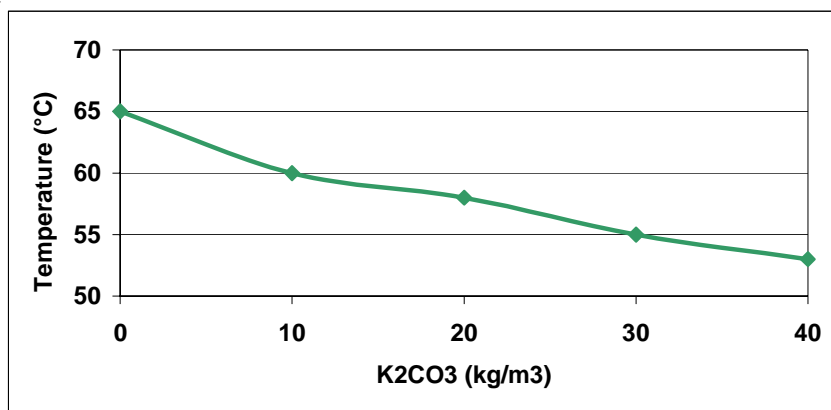
To drill the intermediate sections of Val d'Agri, AVA proposed a system based on

glycol (25-30kg/m³) mixed with K₂CO₃ (40-50 kg/m³).

The mechanisms of shale stabilization by glycol muds suggest that the level of inhibition obtained is mainly due to a shale hardening effect (the shale actually becomes harder than in its original state). Absorption measurements indicate that glycol displaces water from the shale, resulting in a change of pore fluid composition. In effect, glycol acts as a penetrating glue that strengthens the shale, thus forming a barrier that hinders water absorption, preventing clay platelet disruption and minimizing the effects on the drilling process and mud properties. The association with K₂CO₃ provides K⁺ ions that increase osmotic pressure, effectively dehydrating the shale. This system is environmentally safe and contains no polluting compounds.

RESULTS

Typically the same system is used for both intervals with the mud being recovered and reused in the 12¼" section. Properties remain stable with MBT values normally not exceeding 40kg/m³ (14 ppbe). The concentration of glycol is fundamental in maintaining low fluid loss values (<5.0cc) without using specific polymeric filtrate reducers.



CASE STUDY