Case History

GageDrill™ Resolves Hole Stability Issues in Highly Reactive, Unstable Wellbore

San Juan Basin, New Mexico

Challenge
Highly reactive and chemically unstable wellbore

Solution
GageDrill mixed metal oxide (MMO) drilling fluid system

Results
Successful trials on two wells; GageDrill MMO system implemented into operator's drilling program

Maintained or increased ROP

Improved inhibition of the upper-hole clays

In the San Juan Basin, wellbore stability issues were experienced in the upper formations of the intermediate section. Possible causes included overburden stresses and shale hydration in the unconsolidated formations. Sloughing shale was noticed at the shakers due to excessive washing and reaming operations. This is an indicator of wellbore instability and requires increased mud weight and/or shale inhibition. Laboratory analysis of cuttings confirmed that the formation was both highly reactive and mechanically unstable. While the laboratory-recommended shale inhibitors reduced hydration, the increased mud weight frequently exceeded the fracture point of the weak, unconsolidated shallow formation resulting in lost returns.

GageDrill MMO system is a viscoelastic fluid, which is highly shear-thinning while exhibiting pseudo-solid characteristics when static. The result is an exaggerated flow regime that transitions from a low-viscosity fluid at the drill pipe, to zero-flow at the wellbore wall. Its thixotropic nature and rheology profile create a hydraulic annulus that minimizes interaction of the fluid with the reactive and dispersive formations in the upper hole.

The trial well was successfully completed, resulting in the operator changing the drilling program to include GageDrill MMO system for that interval. The GageDrill system remained stable when mechanical issues caused 30 hours of downtime on the second well. The key performance factors that established GageDrill MMO were:

- Maintained or increase the rate of penetration
- Improved inhibition by reducing the hydration of the upper-hole clays
- Reduced buildup of cuttings on the shakers

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