DRILLING FLUIDS FOR DRILLING OF GEOTHERMAL WELLS

Hagen Hole
Geothermal Consultants NZ Ltd., Birkenhead, Auckland, New Zealand.

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ABSTRACT

Drilling fluids are required to remove cuttings from the well during drilling, to cool and lubricate the drill bit and drill string, to apply pressure to formation fluids to control flow into or out of the well, and to cool the formation, particularly prior to cementing casings. Various drilling fluids are selected according to reservoir pressures and temperatures and to the drilling techniques to be utilised. Drilling fluids normally used include water, water based bentonitic (or other) muds, aerated water, and stiff foam.
Because many geothermal reservoirs are set in interlayered volcanic and sedimentary rock and are normally associated with local and regional faulting, highly permeable features are common and cause major and frequent losses of drilling fluid circulation.

The utilisation of aerated fluids and the concept of 'balanced' downhole pressure conditions allows for full circulation of drilling fluids and drilling cuttings back to the surface while drilling through permeable formations, thus significantly reducing the risk of the drill string becoming stuck, of formation and wellbore skin damage, and for full geological control.

Keywords: geothermal, drilling fluids, aerated drilling