

RECEIVEDDetailed Mud Plan - Drilling Hazards

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0-475': Spud MudU.S. GEOLOGICAL SURVEY
ARTESIA, NEW MEXICO

Spud with a viscous fresh water gel mud thickened with lime for a 40-50 sec/1000 cc viscosity. Add paper and fibrous LCM for seepage and more severe loss.

In case of total loss of returns, suggest trying 150-200 bbls of a viscous fresh water gel/lime mud treated 25+ ppb of a coarse, fibrous LCM in an attempt to establish returns. If this is unsuccessful, dry drilling to casing point and spotting 200+ bbls of the above mud will probably be the most economical approach.

475-2690':

Drill 17-1/2" hole with air/mist or foam to top of Delaware Sand at 2690+', if no fluid is encountered. Set 13-3/8" casing at 2690'. If fluid is encountered before reaching 2690' hole will be drilled with a low water-loss polymer brine fluid to 2690+'.

2690-9700':

Drill Bone Spring section to 9700+' on air/mist or foam.

9700-11200': Saturated Brine Water/Polymer

Load with saturated brine water pre-treating with paper to avoid losses during the change-over. Circulate the reserve pits using a flocculant to control solids build-up. Use paper and/or sepiolite/LCM pills mixed in the slug pit to control seepage losses. Use caustic soda for pH control and continue zinc chromate treatments for drill pipe and casing corrosion control. Sweep hole with 100+ bbls of a viscous sepiolite slurry and spot 150-200 bbls prior to coming out to run casing. Should hole conditions warrant, a light mud up with a drispac/starch system is recommended prior to running casing.

NOTE: Be alert for potential gas kicks in the Wolfcamp formation. Prior to drilling this interval, suggest the installation of automatic chokes, rotating head, mud/gas separator, pit volume totalizer, and flow sensor.

11200-11900': Weighted Brine Polymer/KCL

Drill out with existing system. At 11600+', install fine screen shaker and limit circulation to working pits. Treat hardness with soda ash and mud up with sepiolite/Drispac system increasing fluid density to 11.5-12.0 ppg with barite. Use caustic soda for a 10-10.5 pH and zinc chromate for continued drill pipe and casing corrosion control.

NOTE: Suggest the installation of barite bulk hoppers and a fine screen shaker.

Be alert for gas kicks below 11600' requiring mud weights above 11.5-12.0 ppg to control.