Detailed Mud Plan - Drilling Hazards

0-475': Spud Mud

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.

475-26901:

Drill 17-1/2" hole with a low water loss polymer brine fluid to top of Delaware Sand at 2690'.

2690'-11,200': Saturated Brine Water

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 drilling head, mud/gas separator, pit volume totalizer, and flow sensor.

11,200-11,900': Weighted Brine

Drill out with existing system. At $11,600\pm^{\prime}$, 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 11,600' requiring mud weights above 11.5-12.0 ppg to control.

11,900-13,200':

Drill Morrow section with low fluid loss (3 cc) brine gel/KCL polymer mud.