

Date July 31, 1989
 Company Bettis, Boyle & Stovall Location Sec 21, T21S, R29E
Bettis Brothers
 Well Name Eddy County Prospect County Eddy State NM
#114 Big Eddy Unit

CASING PROGRAM

13 3/8" @ 400'
 8 5/8" @ 3,300'
 TD @ 13,300'

RECOMMENDED DRILLING FLUIDS PROPERTIES

Depth	Mud Weight	Viscosity	API Filtrate	pH		
0-400'	8.4-9.0	32-38	NC	10.0		
Drill with Milgel (15-20 lb.bbl), Mil-Lime (1-2 lb.bbl) spud mud, circulating steel pits. Add Cottonseed Hulls and Mil-Fiber for lost circulation. If returns cannot be regained, dry-drill to casing point and spot a viscous pill to ensure proper pipe placement.						
400'-3300'	8.5-10.5	32-34	NC	9.0-10.0		
Drill out with Fresh Water, circulating the reserve pits and mixing Lime for pH maintenance. Utilize native solids to achieve a 32-34 sec/1000 cc funnel viscosity, add water at the flowline as needed to control viscosity in this range. Begin additions of 10.0 lb./gal Brine prior to drilling the anhydrite and salt sections to minimize washouts. Sweep hole with viscous Salt Water Gel or Dyna Sweep pills prior to running pipe. Add Paper-Ox to control seepage; greater losses will usually require Gel/LCM pills.						
For lost circulation, mix a viscous pill consisting of Salt Water Gel (10-20 lb./bbl) and Kwik Seal (10-20 lb./bbl) pump as a sweep at a reduced pump rate to regain returns.						
EXHIBIT "G"						

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Depth	Mud Weight	Viscosity	API Filtrate	pH	
3300'-11,300'	8.4	28-30	NC	10.0-10.5	
<p>Drill out with existing system, circulating the reserves for solids control and mixing Mil-Lime for pH maintenance. Add non-selective flocculant (Jet Jel, Selec Floc) at the flowline to drop out fine drilled solids and maximize use of reserve pit area. Add 10.0 lb./gal Brine to raise fluid weight to required level for increased wellbore stability. Viscous pills consisting of Milgel, Mil-Lime or Dyna-Sweep, pumped as a sweep, will clean wellbore, as well as seal off fractured and permeable zones and minimize losses.</p> <p>While drilling with clear fluid, it may be necessary to periodically sweep the hole with Salt Gel or Dyna Sweep pills to assure adequate hole cleaning. Cutting transport depends on cuttings' size and density, fluid weight and viscosity, and annular flow rates. To transport cuttings uphole with clear water, annular fluid velocities of about 100 ft/min are needed. If annular flow rates are too low to clean the hole, then drilled solids will build up in the annulus, reducing penetration rate and increasing the risk of lost circulation.</p> <p>Seepage losses are usually controlled with Ground Paper additions; more severe losses may require Gel/LCM (fiber, Multi-Seal, etc.) pills. For lost circulation, mix a viscous pill consisting of Salt Water Gel (10-20 lb./bbl) and Kwik Seal (10-20 lb./bbl) pump as a sweep at a reduced pump rate to regain returns.</p>					
11,300'-13,300'	9.8-10.3	32-38	8-12	9.0-9.5	
<p>Return to steel pits, treat make up water with Soda Ash (hardness below 100 mg/l) and Caustic Soda (.3-.5 lb./bbl). Mix XC Polymer (.5-1.0 lb./bbl) for viscosity, Drispac (.5-1.5 lb./bbl) for filtrate control and Potassium Chloride for added</p>					

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<p>shale inhibition. Add pre-hydrated Milgel slurry to supplement polymers for viscosity.</p> <p>NOTE: KCL muds will exhibit slow increase in chlorides (when potassium base exchange is occurring if the same concentration of K⁺ (potassium) is maintained.</p> <p>With property adjustments as dictated by hole conditions, this fluid should provide excellent properties for drilling, testing, logging, and casing operations.</p>						