

**4) Casing and Cementing Program:**

<u>Casing size</u>	<u>interval</u>	<u>weight</u>	<u>grade</u>	<u>connection</u>	<u>Design Factors Coll.,Burst,Ten.</u>
9-5/8"	0-1,300'	36 #	K-55	ST&C	3.32,13.7,9.04
7"	0-5,500'	23#	J-55	LT&C	1.24,2.82,1.68
	5,500'-7,800'	26#	J-55	LT&C	1.22,3.22,5.70

Collapse design considers maximum anticipated mud weight at string T.D. with casing fully evacuated. Burst design uses 0.44 psi/ft for bottom hole pressure and assumes maximum surface pressure as .45 times this number. Tension design considers weight of string in air.

Cementing

9-5/8" Attempt to cement to surface in one stage using:

1<sup>st</sup> Lead: 200 sx Class H + 5 pps gilsonite + 12% CalSeal + 1% CC  
 2<sup>nd</sup> Lead: 1090 sx Light C + 5 pps gilsonite + 2% CC  
 Tail: 205 sx class C + 2% CC

Hole size 14-3/4"  
 cmt yield/wt: 1<sup>st</sup> lead 1.56 cu.ft./sk 14.5 ppg  
 cmt yield/wt: 2<sup>nd</sup> lead 1.92 cu.ft./sk 12.6 ppg  
 cmt yield/wt: tail 1.34 cu. Ft./sx. 14.8 ppg  
 excess: 100%

7" Cement in one stage with 160 sx 65:35:6 Poz:H:Gel + 10% gilsonite, tailed with 200 sx class H w/ 0.6% fla

hole size 8-3/4"  
 cmt yield: lead 2.23 cu.ft./sk 12.1 ppg  
 cmt yield: tail 1.18 cu. Ft./sx. 15.6 ppg  
 top of lead 5000' ( excess: 50%)  
 top of tail 6500' ( excess: 50%)

note: cement volumes will be adjusted by fluid caliper on the 9-5/8" and electric caliper on the 7" string. Cement types and additives may change based on actual downhole conditions.

**5) Type and Characteristics Proposed Circulating Medium:**

<u>from</u>	<u>to</u>	<u>type</u>	<u>wt.</u>	<u>Vis</u>	<u>wl</u>
0	6,000'	fw/gel/lime	8.4-8.6	28-30	nc
6,000'	7,800'	fw/gel/poylmer	8.5-8.7	32-34	<15

No abnormal pressures are anticipated, however, sufficient quantities of mud materials shall be maintained for the purpose of assuring well control. Loss of circulation will be the primary concern, thus an adequate store of lost circulation material shall be maintained. Visual monitoring equipment shall be in place in the pits to detect volume changes.