

**B. Proposed Cement Program (Continued):**

| <u>CASING</u> | <u>LEAD SLURRY</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <u>TAIL SLURRY</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <u>DISPLACEMENT</u>               |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| 5 1/2"        | 565 sacks (35:65) Poz (Fly Ash): Class C Cement + 5 lbs/sack Sodium Chloride + 0.003 gps FP-6L + 6% bwoc Bentonite + 99% Fresh Water;<br>1091 Vol. Cu Ft<br>1.93 Vol. Factor<br>Slurry Weight (ppg) 12.7<br>Slurry Yield (cf/sack) 1.93<br>Amount of Mix Water (gps) 10.33;<br>Amount of Mix Fluid (gps) 10.33;<br>Estimated Pumping Time – 70 BC (HH:MM)-3:00;<br>Free Water (mls) @ 98 Deg. F @ 90 Deg. Angle: 1.8;<br>Fluid Loss (cc/30 min) at 1000 psi and 98 Deg. F: 950.0<br>Compressive Strength:<br>12 hrs @ 106 Deg. F (psi) 280<br>24 hrs @ 106 Deg. F (psi) 375<br>72 hrs @ 106 Deg. F (psi) 900 | 250 sacks Class C Cement + 3% bwow Potassium Chloride +0.2% bwoc CD-32 + 0.6% bwoc FL-62 + 0.2% bwoc Sodium Metasilicate + 56.6% Fresh Water<br>338 Vol. Cu Ft<br>1.35 Vol. Factor<br>Slurry Weight (ppg) 14.8<br>Slurry Yield (cf/sack) 1.35<br>Amount of Mix Water (gps) 6.38;<br>Amount of Mix Fluid(gps) 6.38;<br>Estimated Pumping Time – 70 BC (HH:MM)-2:30;<br>Free Water (mls) @ 98 Deg. F @ 90 Deg. Angle: 0.0;<br>Fluid Loss (cc/30 min) at 1000 psi and 98 Deg. F: 300.0<br>Compressive Strength:<br>12 hrs @ 106 Deg. F (psi) 1200<br>24 hrs @ 106 Deg. F (psi) 1800<br>72 hrs @ 106 Deg. F (psi) 2300 | 100.2 bbls Fresh Water @ 8.33 ppg |

**5 1/2" Casing: Volume Calculations:**

|                     |   |              |      |             |   |                       |
|---------------------|---|--------------|------|-------------|---|-----------------------|
| 400 ft              | x | 0.1926 cf/ft | with | 0% excess   | = | 77.0 cf               |
| 3150 ft             | x | 0.1733 cf/ft | with | 86% excess  | = | 1015.4 cf             |
| 700 ft              | x | 0.1733 cf/ft | with | 174% excess | = | 332.5 cf              |
| 80 ft               | x | 0.1336 cf/ft | with | 0% excess   | = | 10.7 cf (inside pipe) |
| TOTAL SLURRY VOLUME |   |              |      |             |   | = 1435.6 cf           |
|                     |   |              |      |             |   | = 255 bbls            |

All slurries will be tested prior to loading to confirm thickening times and a lab report furnished to Apache. Fluid loss will be tested and reported on slurries with fluid loss additives. Lab test report will be furnished prior to pumping cement.