

14.0 Make up and run 4 1/2" casing as per the following:

- A. Clean exposed threads on the guide shoe, first joint of 4 1/2" casing, float collar, and second joint of casing.
 - B. Apply thread lock to the above listed connections prior to make-up.
 - C. The bottom assembly of the casing assembly must be made up as follows with the first listed being the first in the hole:
 - 1. Guide shoe
 - 2. First joint of 4 1/2" casing
 - 3. Float collar
 - 4. 4 1/2" casing back to setting depth of 2950' (140' below the salt).
 - 5. Combination Tool (DV Tool with External Casing Packer)
 - 6. 4-1/2" casing back to surface.
 - D. Install centralizers as follows on the 4-1/2" casing:
 - 1. 10' above the guide shoe by means of a stop collar.
 - 2. Around the first coupling above the float collar.
 - 3. Every third coupling back to the combination tool.
 - 4. Around the coupling immediately below the combination tool.
 - 5. Around the coupling immediately above the combination tool.
 - 6. Every third coupling back to surface.
15. With casing on bottom, circulate mud a minimum of one circulation. Monitor returns to ensure hole is "clean".
16. Cement the 4 1/2" casing string as follows:
- A. Reciprocate the casing during the first stage circulation and cementation.
 - B. Once the first stage cement is in place (Figure 1), drop the **EXTERNAL CASING PACKER / DV TOOL ACTUATION DEVICE** (a.k.a. Ball, Bomb, Plug, Dart (Figure 2)).
 - C. With guidance from the tool manufacturers representative, set the external casing packer and open the DV tool.
 - D. Circulate one complete circulation through the DV tool to ensure any residual cement from the first stage is removed from the annulus above the combination tool.
 - E. Pump the second stage cement into position followed by the **SECOND STAGE FOLLOWING PLUG**. Displace cement and plug with drilling fluid. The **SECOND STAGE FOLLOWING PLUG** will close the DV tool ports when the cement is in place (Figure 3).