

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).

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