

Cementing Contingency Plans

1. Lost Circulation:
 - a. Have sufficient mud volumes on location to displace cement in the event of total lost returns.
 - b. If lost return occur during preliminary circulation prior to cement being pumped – switch immediately to spacer and pump cement as per program.
 - c. Consider slurry pump times and the possibility of reducing the planned displacement rates to minimize losses, while still putting the cement in place.
 - d. Monitor and keep annulus full.

Note: If returns are lost prior to running casing and cannot be cured: Consider design changes that could include changes in spacer and slurry density, height and rates. LCM can be included in the slurry or spacers if deemed appropriate.
2. Unplanned shut downs:
 - a. If prior to cement being pumped – shut down and make necessary repairs.
 - b. Once cement has been pumped – if the cement unit goes down have rig pumps lined up and ready to take over the displacement or conversely if rig pumps are being used for the displacement switch to the cement unit.
3. Unplanned rate change:
 - a. Have sufficient safety factor designed into the cement pump time to allow for the slurry to be put in place at a reduced rate.
4. Float equipment does not hold differential pressures:
 - a. Casing string to surface: shut down and hold final displacement pressure on the cement until such time as the cement has gained sufficient strength to remain in place.
 - b. Liner: Hold final displacement pressure on landing string while setting and testing liner top packer. Pull and or strip sufficient drill pipe from the well to clear any possible cement returns above the liner top. Shut annular and pump back any volume gained over normal pipe displacement and hold final displacement pressure until such time as the cement has gained sufficient strength to remain in place.
5. Surface equipment issues/failure: (during cementing pumping operation)
 - a. Casing to surface:
 - i. Water base mud: If failure occurs prior to having enough cement pumped to cover all potential flow zones with 500' of cement and

assuming that cement can be handled at surface or discharged, circulate cement out of annulus, repair system and re-cement.

ii. Oil Based Mud:

1. Same as above if able to handle the volume of contaminated mud and cement at the surface (cuttings boxes and/or a pit - returns mixed with sufficient retarder to prevent setting).
2. If the volume pumped is such that we are unable to handle the contaminated mud and cement at the surface, displace the cement up to the planned top of cement (thus placing the cement above any potential flow zones in the annulus). WOC. Perform second cement job squeezing enough cement to fill the shoe track, and annulus up to the bottom of the first plug. Note: If cement were to be left inside the casing to be drilled out and the casing re-cemented, it would be necessary to nipple down the BOPs and hang off the casing with no cement in the annulus for isolation.

b. Liners :

- i. Failure occurs with cement still in drill pipe above top of liner, but insufficient cement to cover any potential flow zones – stop displacement, pull running tool above liner top and reverse out cement. POOH. GIH with (drillable-temperature permitting) retainer and set inside liner above shoe track, circulate cement into liner annulus to within 100' of the previous shoe. POOH. If cement to 100' of previous shoe is insufficient to adequately cover any potential flow zones, ie...potential flow zones within 600' of previous shoe, squeeze liner top. GIH with liner packer setting tool to $\pm 50'$ above top of liner, close preventer and squeeze liner lap with sufficient cement to fill the liner lap and any open hole left uncemented. Whether liner top squeezed or not set liner top packer, test same to 1000 psi over final squeeze pressure. POOH.