

REMEDIAL CEMENT PROCEDURE  
MUDGE LS 6

1. MIRUSU.
2. Install BOP.
3. Kill well with fresh water, clean out to PBTD of 5250'.
4. TOH with 2 3/8" tubing.
5. TIH with RBP and set at 4100'. Cap with 5 sacks of sand.
6. Determine free point of 4 1/2" casing.
7. TIH with string shot and back off of 4 1/2" casing at the nearest joint above the free point.
8. TOH with 4 1/2" casing. Inspect and replace any bad joints. Note any worthy findings of pipe condition.
9. Clean out hole to 4 1/2" casing top. Use casing scraper for 7", 23 lb/ft casing.
10. TIH with RBP and set just above 4 1/2" casing top. Cap with 5 sacks of sand.
11. Pressure test the 7" casing to 1000 psi.
12. If casing does not hold pressure, locate leak(s), and notify Paul Edwards in the Denver office before proceeding with any squeeze work.
13. Run a GR/CBL from the 4 1/2" casing top to surface. Make several passes if necessary at consecutively higher pressures if the bonding is not well defined.
14. TIH with a 4 1/2" casing gun and perforate one hole below 2750' if possible and one hole at 2100'.
15. TIH with cement retainer and set at 2600'. Establish circulation between perforations until returns are clean; reverse circulate. Check volumes with a dyed water.
16. Conduct a suicide squeeze by pumping 290 sacks of cement through bottom set of perfs. Because this squeeze is being conducted across the PC & Fruitland, the cement slurry should contain adequate fluid loss additives and should be preceded by a preflush used in high fluid loss applications.

NOTE: Squeeze volume is based on 300% of calculated annular volume.  
Check volumes with results of step 13.

17. Sting out of retainer, hold pressure on squeeze, and WOC.
18. Drill out cement to RBP. Pressure test squeeze perfs and resqueeze if necessary. Determine the degree and extent of cement bonding.
19. Reset RBP to 1100' and cap with sand.
20. TIH with a 4 1/2" casing gun and perforate one hole at approximately 900'. Check depth with the TOC from step 13.
21. Establish circulation to surface through perfs until returns are clean; reverse circulate. Calculate annular volume.
22. Conduct a circulation squeeze by pumping 270 sacks through tubing. Do not displace until cement returns are seen at the surface. Displace with water, hold pressure on squeeze, and WOC. Check volumes with step 21.
23. Drill out cement, pressure test, and resqueeze if necessary.
24. Run casing scraper and clean out hole to RBP at 1100'. TOH with RBP.
25. TIH with 4 1/2" casing, and a screw in joint. Screw into 4 1/2" casing top.
26. Pressure test casing.
27. TOH with RBP at 4100'.
28. TIH with open ended 2 3/8" tubing, mule shoe, and seating nipple one joint off bottom. Land tubing at 5220'.
29. Return well to production.