

## **PLUG AND ABANDONMENT PROCEDURE**

Engineer: Taj Brar (970-339-1088)

1. Call foreman or Lead Operator before rig up to isolate and remove automation and production equipment. Install fence if needed.
2. MIRU slickline services & VES. Pull bumper spring, tag bottom (Gyro completed 9/9/2011). RDMO SL.
3. Provide notice to COGCC prior to MIRU per Form 6 COA.
4. Notify IOC when rig moves on location to generate work order for flowline removal and one call for line locates.
5. Prepare location for base beam rig.
6. MIRU WO rig. Kill well; circulate as necessary, with water containing biocide. ND wellhead. NU BOP's. Unseat landing joint and lay down.
7. Place cement services on will call when rig moves on location, providing expected volumes of cement needed. (~110sx for top plug; 240 sx for Foxhills plug ~210 sx for SX/SH plug and 170 sx for NB/CD plug). See attached WBD for cement blends.
8. TOOH and stand back 2-3/8" TBG.
9. MIRU wireline services. RIH gauge ring for 4-1/2" casing to 7950'.
10. PU 4-1/2" CIBP and RIH on W/L to +/-7910'. Set CIBP.
11. Dump bail 2 sx of cement on CIBP.
12. PU 4-1/2" CIBP and RIH on W/L to +/-7770'. Set CIBP.
13. Dump bail 2 sx of cement on CIBP.
14. PU 4-1/2" CIBP and RIH on W/L to +/-7330'. Set CIBP. P/T CIBP to 1000 psi.
15. Dump bail 2 sx of cement on CIBP.

16. PU RIH with CCL-GR-CBL-VDL. Run from 7280' to surface to verify cement behind 4-1/2" CSG. Cement placement in this procedure may be adjusted based on log results.
17. PU two 1' 3-1/8" perf guns loaded with 3 spf, 0.5" EHD, 120 phasing. Shoot 1' of squeeze holes at 7150' and 6660'. RD wireline.
18. PU 4-1/2" CICR and RIH on 2-3/8" TBG to +/- 6690'. Hydrotest TBG to 3000 psi while RIH. Set CICR
19. Initiate circulation using water containing biocide. Note rate and pressure.
20. MIRU cementing services. Pump 170 sx of 50/50 Poz "G" w/ 20% silica flour , 3% gel , 0.1% sodium metasilicate and 0.4% FL-52, mixed at 13.5 ppg and 1.71 cuft/yield. (Excess used = 40%). Cement from 7150' to 6660'
21. Underdisplace by 3BBL. Unsting from CICR and dump remainder on CICR.
22. PUH 9 stands. Circulate (TBG Vol + Excess) to CLR TBG. RD cementing services
23. Load hole and circulate with 9.0 ppg mud containing biocide.
24. P&SB 4340' of TBG (70 Stands). LD remainder.
25. RU wireline services. PU two 1' 3-1/8" perf guns loaded with 3 spf, 0.5" EHD, 120 phasing. Shoot 1' of squeeze holes at 4710' and 4310. RD wireline.
26. PU 4-1/2" CICR and RIH on 2-3/8" TBG to 4340'. Set CICR
27. Initiate circulation through CICR using water containing biocide. Note rate and pressure.
28. MIRU cementing services. Preflush with 5 bbl of H2O; 20 bbl of sodium metasilicate; 5 bbl of H2O.
29. Pump 210 sacks of "G" w/ 0.25 pps cello flake , 0.4% CD-32, 0.4% ASA - 301, mixed at 15.8 ppg and 1.15 cuft/sk. (Cement Excess used = 40% considering 9" hole) Cement from 4710' to 4310'.

30. Underdisplace by 3BBL. Unsting from CICR and dump remainder on CICR
31. PUH 9 stands. Circulate (TBG Vol + Excess) to CLR TBG. RD cementing services.
32. Load hole and circulate with 9.0 ppg mud containing biocide.
33. P&SB 1130' of TBG (20 Stands). LD remainder.
34. RU wireline services. PU two 1' 3-1/8" perf guns loaded with 3 spf, 0.5" EHD, 120 phasing. Shoot 1' of squeeze holes at 1716' and 1100'.
35. PU 4-1/2" CICR and RIH on wireline to 1130'. Set CICR. RD wireline
36. TIH w/ 2-3/8" TBG to 1130'.
37. Pump 240 sacks of Type III w/ celloflake and CaCl<sub>2</sub> mixed at 14.0 ppg and 1.53 cuft/sk with 40% excess. Cement from 1716' to 1100'.
38. Underdisplace by 3BBL. Unsting from CICR and dump remainder on CICR
39. PUH 9 stands. Circulate (TBG Vol + Excess) to CLR TBG. RD cementing services.
40. Load hole and circulate with 9.0 ppg mud containing biocide.
41. RU wireline services. Crack closest coupling at 300' or shoot off.(as deep as possible above cement top). RD wireline.
42. Circulate with mud w/ biocide.
43. NDBOP, NDTH.
44. NU BOP on casing head. Install 4-1/2" pipe rams.
45. TOO H with 4-1/2" casing and lay down. Install 2- 3/8" pipe rams.
46. RIH with 2-3/8" TBG into casing stub to TOC inside 4-1/2"
47. RU Cementing services. Spot +/- 110 sx of Type III w/ celloflake and CaCl<sub>2</sub> mixed at 14.0 ppg and 1.53 cuft/sk and with 40% cement excess. Cement from 1034' to 100'. PUH to 100' & circulate 9.0 PPG mud w/ biocide to clear TBG. TOO H. WOC 4 hrs

48. TIH and tag cement plug. If plug top is below 100', top as necessary.
49. MIRU wireline services. PU 8-5/8" CIBP and RIH to 100'. Set CIBP. Pressure test CIBP to 1000 psi for 15 minutes. If plug tests, RDMO wireline and WO rig
50. Wellsite supervisor turn all paper copies of cementing reports/invoices and logs in to Joleen Kramer. NOTE: During the job, wellsite supervisor should instruct the logging and cementing contractors to e-mail all logs, job reports/invoices to Joleen Kramer.
51. Have excavation contractor notify One-Call to clear for excavating around wellhead and flowline removal.
52. Excavate hole around surface casing of sufficient size and depth to allow welder to cut off 8-5/8" surface casing and at least 5' below ground level.
53. Have welder cut off 8-5/8" surface casing at least 5' below ground level.
54. MIRU ready cement mixer. Use 4,500 psi compressive strength redi-mix cement (sand and cement only, no gravel) Fill STUB. RDMO cement services.
55. Have welder spot weld steel marker plate on top of surface casing. (Note: marker shall be labeled with well name and number, legal location (¼ ¼ description) and API number.
56. Properly abandon flowlines as per Rule 1103.
57. Have excavation contractor back fill hole with native material. Clean up location and have leveled.
58. Submit Form 6 to COGCC. Provide "As Plugged" wellbore diagram identifying the specific plugging completed.