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## PLUG and ABANDONMENT PROCEDURE

### RICHARDSON V 3-1JK

#### Step Description

1. Provide 48 hour notice to COGCC prior to rig up per request on approved Form 6 (e.g. call field coordinator, submit Form 42, etc.). Notify Automation Removal Group at least 24 hours prior to rig move. Request they catch and remove plunger, isolate production equipment, and remove any automation prior to rig MIRU.
2. MIRU Slickline. Pull production equipment and tag bottom. Record tag depth in Open Wells. Gyro was ran on 9/29/14. RDMO slickline.
3. Prepare location for base beam equipped rig. Install perimeter fence as needed.
4. Verify COAs before RU.
5. Upon RU, check and record bradenhead pressure. If bradenhead valve is not accessible, re-plumb so that valve is above GL. Blow down bradenhead and re-check pressure the next day. Repeat until pressure stays at 0 psi.
6. MIRU WO rig. Spot a min of 50 jts of 2-3/8" 4.7#, J-55, EUE tbg. Kill well as necessary using clean fresh water with biocide. ND WH. NU BOP. Unland tbg using unlanding joint and LD.
7. TOO H and SB 7810' 2-3/8" tbg. LD any remainder.
9. PU and TIH with (4-1/2", 11.6#) Bit and Scraper on 2-3/8" tbg to 7810'. TOO H, SB 7800' 2-3/8" tbg and LD remaining tbg and bit and scraper.
8. MIRU Hydrotester. PU (4-1/2", 11.6#) hydraulically-set CIBP and TIH while hydrotesting to 3000 psi to +/- 7800' to abandon the J Sand perfs. RDMO Hydrotester.
10. Hydraulically set CIBP at +/- 7800' (collars at 7795' & 7835'). Release tbg from CIBP. Load hole with biocide treated fresh water and circulate all gas from well. PT CIBP to 1000 psi for 15 minutes.
11. MIRU hydrotesters. TIH with 2.375" tbg to 7150' while hydrotesting to 3000 psi. RDMO hydrotesters.
12. Load hole with biocide treated fresh water and circulate all gas out of well. PT CIBP to 1000psi for 15 minutes.
13. MIRU Cementers. Pump Niobrara Plug: Pump 60 sxs (93cf), assuming 15.8 ppg & 1.55 cf/sk. Volume based on 1050' inside 4.5", 11.6# production casing with no excess. Cement will be from 7800'-6750'. RD cementers.
14. Slowly pull out of the cement and TOO H to 6250'. Reverse circulate using biocide treated fresh water, to ensure the tubing is clean. TOO H and SB 4130' of 2-3/8" tbg. LD remaining tbg.
15. MIRU WL. PU and RIH with two 3-1/8" perf guns with 3 spf, min 0.5" EHD, 120° phasing. Shoot 2' of squeeze holes at 4510' and 4' of squeeze holes at 4100'. RDMO WL.
16. PU and TIH with (4.5", 11.6#) CICR on 2-3/8" tbg. Set CICR at 4130'.
17. Establish circulation to surface with biocide treated fresh water, and pump 100 bbls to clean up hole.
18. RU Cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Sussex Squeeze: 195 sxs (227cf) with 0.25 lb/sk polyflake, assuming 15.8 ppg & 1.17 cf/sk. Underdisplace by 3 bbls. Volume is based on 380' below the CICR inside 4.5", 11.6# production casing with no excess, 410' in the 4.5", 11.6# annulus assuming 7.88" bit size with 60% excess and 190' on top of the CICR to cover top perfs. RD cementers.
19. Slowly pull out of the cement and TOO H to 3440'. Reverse circulate to ensure no cement is left in the tbg.
20. TOO H and SB 1210' of 2.375" tbg. LD CICR, stinger, and remaining tbg.
21. MIRU WL. RIH and jet cut 4.5", 11.6# casing at 1110'. RDMO WL.
22. Attempt to establish circulation and circulate (82bbl) with fresh water containing biocide to remove any gas.
23. ND BOP. ND TH. Un-land casing using a casing spear, not a lifting sub. Rig max pull shall be 100,000#. Max pull over string weight shall be 50,000#. If unable to unland, contact Engineering.
24. Install BOP on casing head with 4.5", 11.6# pipe rams.
25. TOO H and LD all 4.5", 11.6# casing. Remove 4.5", 11.6# pipe rams and install 2.375" pipe rams.
26. TIH with mule shoe and 2.375" tubing to 1210'.
27. Establish circulation with biocide treated fresh water and pump one hole volume (84 bbl).
28. RU Cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Stub Plug: 230 sxs (267cf) with 0.25 lb/sk Polyflake, assuming 15.8 ppg & 1.16 cf/sk. Volume is based on 100' in 4.5", 11.6# production casing with no excess, 343' in 7.88" bit size w/ 60% excess factor, and 200' in the 8-5/8", 24# surface casing with no excess. The plug is designed to cover 1210'-567'. RDMO cementers. Notify engineering if circulation is ever lost during job.

29. Slowly pull out of the cement and TOO H to 100'. Reverse circulate using biocide treated fresh water, to ensure the tubing is clean. TOO H, LD all 2.375" tbg.
30. MIRU WL. Tag cement as needed. RIH 8-5/8", 24# CIBP to 80'. RDMO WL and WO rig.
31. 24 hours of completion of the job.
32. Supervisor submit paper copies of all invoices, logs, and reports to VWP Engineering Specialist.
33. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
34. Capping crew will set and secure night cap on 8-5/8", 24# casing head, restrain the casing head, pressure test CIBP to 500 psi with hydrotest pump, then remove night cap and casing head restraints.
35. Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level.
36. Welder cut casing minimum 5' below ground level.
37. Fill casing to surface using 4500 psi compressive strength cement (NO gravel).
38. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
39. Obtain GPS location data as per COGCC Rule 215 and send to [rscDJVendors@anadarko.com](mailto:rscDJVendors@anadarko.com).
40. Properly abandon flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.
41. Back fill hole with fill. Clean location, and level.
42. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.