

Engineer: VALERIE WHITE

Cell: 307-696-3591

## PLUG and ABANDONMENT PROCEDURE

### RICHARDSON V 3-15 JI

#### Step Description of Work

1. Provide 48 hr notice to COGCC prior to rig up per request on approved Form 6 (e.g. call field coordinator, submit Form 42, etc.). Call Automation Removal Group at least 24 hr prior to rig move. Request they catch and remove the plunger, isolate production equipment and remove any automation prior to MIRU.
2. MIRU Slickline. Pull bumper spring and tag bottom. Record tag depth in Open Wells. Well has a gyro survey from 04/16/2014 to 7800'. RD slickline.
3. Prepare location for base beam equipped rig. Install perimeter fence as needed. Order a minimum of 25 joints additional 2-3/8, 4.7#, J-55 8RD EUE tbg.
4. Check and record bradenhead pressure. If bradenhead valve is not accessible, re-plumb so that valve is above GL. The last Form 17 test on 12/04/2014 recorded a bradenhead pressure of 1 psi with no fluids produced. Blow down bradenhead and re-check pressure the next day. Repeat until pressure stays at 0 psi. Contact Evans Engineering if pressure does not blow down to 0 and stay at 0.
5. MIRU WO rig. Kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unland tbg.
6. TOOH and SB all of the 2-3/8" tbg.
7. TIH with 4-1/2", 11.6# csg scraper on 2-3/8" tbg down to 7855' and TOOH. SB 7190' of 2-3/8" tbg.
8. RIH with 4-1/2" CIBP (11.6#, N-80) and set at +/- 7845' (collars at 7818' and 7860') to abandon the J sand perfs. TOOH. RIH to dump 2 sx on CIBP. TOOH.
9. RIH with 4-1/2" (11.6#, N-80) CIBP and set at +/- 7190' (collars at 7165' and 7207'). TOOH. Standby WL.
10. TIH with 2-3/8" tbg to 2500'. Load hole with biocide treated fresh water and circulate the gas out of the well. TOOH
11. RIH and run CBL from 7190' to surface. Forward CBL to Evans office. Cementing plans may change depending on CBL results (Procedure assumes that there is no cement from TOC @ 6780' to surface). RD WL.
12. PT to 1000 psi for 15 minutes. If PT fails, contact Evans Engineering.
13. RIH with tubing to 7190' while hydrotesting in to 3000 psi.
14. RU cementers. Establish circulation with biocide treated fresh water. **Pump Niobrara Balance Plug:** Pump 25 sxs (37.75 cf) Thermal 35 + 0.3% CFR-2 +0.3% ASM-3 (AS-3) mixed at 15.6 ppg & 1.51 cf/sk. Volume based on 405' above the CIBP inside the 4.5" production casing. RD cementers. Plug designed to cover 7190' to 6785'.
15. Slowly pull out of the cement and PUH to 6400'. Reverse circulate tubing clean to ensure no cement is left in the tubing. TOOH and SB 4120' of 2-3/8" tbg.
16. RU WL. RIH with two 3-1/8" perf guns with 3 spf, min 0.5" EHD, 120° phasing. Shoot 1' of squeeze holes at 4975' and 2' of squeeze holes at 4090'. RD WL.
17. PU CICR (4-1/2", 11.6#, N-80) on 2-3/8" tbg. TIH and set CICR at 4120' (Refer to Wireline's perforation run for collar locations).
18. RU cementers. Establish circulation to surface with biocide treated fresh water. **Pump Shannon/Sussex Squeeze:** : Pump 5 bbls fresh water, 20 bbls sodium metasilicate and 5 bbls fresh water followed by 375 sxs (431.25 cf) 0:1:0 'G' + 0.5% CFR-2 + 0.2% FMC + 0.5% LWA + 0.25 lb/sk Polyflake mixed at 15.8 ppg & 1.15 cf/sk. Underdisplace by 3 bbls. Volume based on 855' below the CICR inside 4-1/2" (11.6#, N-80) production casing, 885' in the 4-1/2" production casing annulus assuming 8.75" OH from the caliper log with 20% excess, and 265' on top of the CICR. RD cementers.
19. Slowly pull out of the cement and PUH to 3555'. Reverse circulate tubing clean to ensure no cement is left in the tubing. TOOH and SB 1215' of 2-3/8" tbg.
20. RU WL. RIH with jet cutter and cut 4-1/2" casing at 1115'. RD WL.
21. Circulate with fresh water containing biocide to remove any gas.

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22. Un-land casing. ND BOP. ND TH. Install BOP on casing head with 4-1/2" pipe rams. Install 5000 psi ball valves on both casing head outlets. Install a choke or choke manifold on one outlet.
23. TOO H and LD 1115' of 4-1/2" casing. Remove 4-1/2" pipe rams and install 2-3/8" pipe rams.
24. RIH with 2-3/8" tbg to 1215'.
25. RU Cementers. Establish circulation with biocide treated fresh water, 10 bbls (min) SAPP, followed by 20 bbls fresh water spacer. **Pump Stub Plug:** 220 sxs (292.6 cf) Type III + 0.3% CFL-3 + 0.3% CFR-2 + 0.25lb/sk Polyflake, mixed at 14.8 ppg and 1.33 cf/sk. Volume is based on 100' in 4-1/2" production casing with no excess, 349' of 8.75" OH from log with 40% excess, and 200' in 8-5/8" surface casing with no excess. The plug will cover 1215' to 566'. RD cementers.
26. Slowly pull out of the cement and PUH to 300'. Reverse circulate tubing clean to ensure no cement is left in the tubing.
27. WOC per cement company recommendation. TIH and Tag cement. Cement top needs to be at or above 666'. TOO H.
28. RU WL. RIH with 8-5/8" CIBP (8-5/8", 24# casing) and set at +/- 80. RDMO WL and WO rig.
29. Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@anadarko.com within 24 hrs of completion of the job.
30. Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
31. Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
32. Capping crew will set and secure night cap on 8 5/8" casing head, restrain the casing head, pressure test CIBP to 500 psi with hydrotest pump, then remove night cap and casing head restraints.
33. Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
34. Welder cut casing minimum 5' below ground level.
35. Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
36. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
37. Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
38. Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
39. Back fill hole with fill. Clean location, level.
40. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.