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PLUG and ABANDONMENT PROCEDURE

SPRAGUE LEO F. ET UX GU 1

Step   Description of Work

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 isolate production equipment, and remove any automation prior to rig MIRU.
2. MIRU Slickline. Pull bumper spring and tag bottom. Record tag depth in Open Wells. Well has a gyro survey from 9/25/2014. RD slickline.
3. Prepare location for base beam equipped rig. Install perimeter fence as needed.
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 09/17/2013 recorded a bradenhead pressure of 1 psi, blown dead 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. Load hole using clean fresh water with biocide to control well. ND WH. NU BOP. Unland tbg using unlanding joint and LD.
6. TOOH and SB 7300' of 2-3/8" tbg.
7. TIH with 4-1/2" csg scraper and 2-3/8" tbg down to 7300' and TOOH. SB 6730' of 2-3/8" tbg.
8. MIRU Wireline. RIH with 4-1/2" CIBP and set at +/- 7270' to abandon the Codell perfs. TOOH. RIH to dump 2 sx on CIBP. TOOH. RD WL.
9. TIH with 2-3/8" tbg to 2500'. Load hole with biocide treated fresh water and circulate the gas out of the well. PT to 1000 psi for 15 minutes. TOOH
10. RU WL. RIH and run CBL from 7200' to surface. Record TOC (~7150') and where cmt is over casing split (~5087').
11. RIH with two 3-1/8" perf guns with 3 spf, min 0.5" EHD, 120° phasing. Shoot 1' of squeeze holes at 7100' and 2' of squeeze holes at 6700'. RD WL.
12. PU CICR (4-1/2" 10.5#, CW-55) and 2-3/8" tbg and RIH while hydrotesting tubing to 3000 psi. Set CICR at 6730' (Refer to Wireline's perforation run for collar locations). PT CICR to 500 psi for 15 minutes.
13. <u>RU cementers.</u> Establish circulation with biocide treated fresh water. **Pump Niobrara Squeeze:** Pump 5 bbls fresh water, 20 bbls sodium metasilicate and 5 bbls fresh water followed 140 sxs (230 cf) 1:1:3 Poz:G:Gel + 20% silica + 0.4% CFL-3 + 0.4% CFR-2 + 0.1% SMS mixed at 13.5 ppg & 1.66 cf/sk. Underdisplace by 3 bbls. Volume based on 370' below the CICR inside 4-1/2" production casing, 400' in the 4-1/2" csg annulus assuming 9.5" OH from the log with 20% excess, and 193' on top of the CICR. RD cementers.
14. Slowly pull out of the cement and PUH to 6300'. Reverse circulate tubing clean to ensure no cement is left in the tubing. TOOH and SB 4160' of 2-3/8" tbg.
15. 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 4340' and 2' of squeeze holes at 4130'. RD WL.
16. PU CICR (4-1/2" 10.5#, CW-55) and 2-3/8" tbg and RIH. Set CICR at 4160' (Refer to Wireline's perforation run for collar locations). PT CICR to 500 psi for 15 minutes.
17. <u>RU Cementers.</u> Establish circulation to surface with biocide treated fresh water. **Pump Sussex Squeeze:** Pump 5 bbls fresh water, 20 bbls sodium metasilicate and 5 bbls fresh water

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followed 160 sxs (170 cf) 1.1 'Poz:G' + 0.6% CFL-2 + 0.5% CFR + 0.6% SMS + 0.2% SPC-2 + 0.1% LTR mixed at 14.6 ppg & 1.12 cf/sk. Underdisplace by 3 bbls. Volume is based on 180' below the CICR inside 4-1/2" production casing, 210' in the 4-1/2" csg annulus assuming 11" OH from the log with 20% excess, and 193' on top of the CICR. RD cementers.

18. Slowly pull out of the cement and PUH to 3600'. Reverse circulate to ensure no cement is left in the tbg. TOOH and SB 1110'.
19. RU WL. RIH and cut 4-1/2" casing at 1010'. RD WL.
20. Circulate with fresh water containing biocide to remove any gas.
21. Un-land casing. ND BOP. ND TH. Install BOP on casing head with 4-1/2" pipe rams.
22. TOOH and LD 1010' of 4-1/2" casing. Remove 4-1/2" pipe rams and install 2-3/8" pipe rams.
23. RIH with 2-3/8" tbg to 1110'.
24. <u>RU Cementers.</u> Establish circulation with biocide treated fresh water, 10 bbls (min) SAPP, followed by 20 bbls fresh water spacer. **Pump Stub Plug**: 430 sxs (570 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, 530' of 11" OH from log with 40% excess, and 200' in 8-5/8" surface casing with no excess. The plug will cover 1110' - 280'. RD cementers.
25. Slowly pull out of the cement and PUH to 150'. Circulate using biocide treated fresh water, to ensure the tubing is clean. PU to 100' and WOC per cement company recommendation.
26. RIH and tag cement. Cement needs to be at or above 280'. If tag is below 280', call Evans Engineering.
27. RU WL. RIH 8-5/8" CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. RDMO WL and WO rig.
28. Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@anadarko.com within 24 hours of completion of the job.
29. Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
30. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
31. Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level.
32. Welder cut casing minimum 5' below ground level.
33. Fill casing to surface using 4500 psi compressive strength cement (NO gravel) if necessary.
34. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
35. Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
36. Properly abandon flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.
37. Back fill hole with fill. Clean location, and level.
38. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.