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PLUG AND ABANDONMENT PROCEDURE

RUSCH 33-15, API 05-123-21818

Steps

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.). Call 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 services and pressure bomb services. Pull bumper spring, tag bottom, and run pressure bomb survey from surface to 7550' making gradient stops every 1000'. Forward pressure bomb results to Evans Engineering. RDMO slickline services and pressure bomb services. Note: Do not run pressure survey after the well has been blown down and/or killed w/ water.
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.
5. MIRU, kill as necessary using clean fresh water with biocide. NDWH. NUBOP. Unseat landing jt, LD.
6. Notify cementers to be on call. Provide volumes listed below:
 - 6.1 Niobrara suicide: 50 sx (86 cu-ft) 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 cu-ft/sk. Cement volume based on 180' in 4 1/2" casing and 180' in an 8" OH with 20% excess. Caliper on file.
 - 6.2 Sussex suicide: 230 sx (265 cu-ft) "G" w/ 0.25 pps cello flake, 0.4% CD-32, 0.4% ASA-301, mixed at 15.8 ppg and 1.15 cu-ft/sk. Cement volume based on 500' in 4 1/2" casing and 500' in a 9" OH with 20% excess. Caliper on file.
 - 6.3 Foxhills plug: 220 sx (293 cu-ft) Type III w/ cello flake and CaCl₂ as necessary, mixed at 14.8 ppg and 1.33 cu-ft/sk. Cement volume based on 100' in 4 1/2" casing, 381' in a 9" OH with 20% excess, and 209' in 8 5/8" casing. Caliper on file.
7. TOOH 2 3/8" tubing landed at 7507'. Stand back 2 3/8" tubing.
8. MIRU WL. RIH gauge ring for 4 1/2" 11.6# casing to 7500'. POOH.
9. PU 4 1/2" 11.6# CIBP and RIH w/WL. Set at +/- 7450' to abandon J Sand perms. PT to 1000 psi for 15 minutes. PU dump bailer, dump bail 2 sx class "G" cement on CIBP. POOH.
10. PU 3 1/8" perf guns with 3 spf, 120 degree phasing, 0.50" EHD and RIH w/ WL. Shoot 1' of squeeze holes at 6580' and 6400'. POOH, RD WL.
11. PU and RIH with CICR and 2 3/8" tubing, set CICR at +/- 6430'. Hydrotest tubing to 3000 psi while RIH. Establish circulation with rig pump using biocide treated water.
12. RU cementers, pump Niobrara suicide: 50 sx (86 cu-ft) 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 cu-ft/sk to place cement between perms from 6580' to 6400'. Under displace and sting out of CICR to leave 3 bbls (~200') of cement on top of retainer. Cement volume based on 8" OH with 20% excess. Caliper readings across entire interval. RDMO cementers.

13. PUH to +/- 6000'. Reverse circulate with biocide treated water to displace cement and clear tubing.
14. POOH. Stand back 3830' of tubing.
15. RU WL. PU 3 1/8" perf guns with 3 spf, 120 degree phasing, 0.50" EHD and RIH w/WL. Shoot 1' of squeeze holes at 4300' and 3800'. RD WL.
16. PU and RIH w/CICR and 2 3/8" tubing, set CICR at +/- 3830'. Establish circulation with rig pump using biocide treated water.
17. RU cementers. Establish circulation with biocide treated water and precede cement with 5 bbl water containing biocide, 20 bbl sodium metasilicate and another 5 bbl water spacer.
18. Pump Sussex suicide: 230 sx (265 cu-ft) "G" w/ 0.25 pps cello flake, 0.4% CD-32, 0.4% ASA-301, mixed at 15.8 ppg and 1.15 cu-ft/sk to place cement between perms from 4300' to 3800'. Under displace and sting out of CICR to leave 3 bbls (~200') on top of retainer. Cement volume based on 9" OH with 20% excess. Caliper readings across entire interval. RD cementers.
19. PUH to +/- 3400'. Reverse circulate with biocide treated water to displace cement and clear tubing.
20. P&SB 1000', LD remainder.
21. RU WL. Shoot off 4 1/2" casing at or below 900'. RD WL. Circulate casing with biocide treated water to remove any gas.
22. NDBOP, NDTH.
23. Install BOP on casing head with 4 1/2" pipe rams.
24. TOO 4 1/2" casing, LD.
25. RIH with 2 3/8" tubing to 1000' inside 4 1/2" casing.
26. RU cementers. Establish circulation with biocide treated water and precede cement with 10 bbl SAPP and a minimum 20 bbl fresh water spacer. Pump Foxhills plug: 220 sx (293 cu-ft) Type III w/ cello flake and CaCl₂ as necessary, mixed at 14.8 ppg and 1.33 cu-ft/sk. Plug to cover 1000'-900' in 4 1/2" casing, 900'-519' in 9" OH with 20% excess, and 519'-310' in 8 5/8" casing. Caliper readings across entire interval. RD cementers.
27. PUH to 100' and circulate with water and biocide to displace cement and clear tubing.
28. WOC per cement company recommendation. Tag cement at or above 410'. If not, consult with Evans Engineering.
29. RU WL. RIH 8 5/8" 24# CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. If tests, RDMO WL and WO rig.
30. Instruct cementing and wireline contractors to email copies of all job logs/jobs summaries to rscDJVendors@anadarko.com within 24 hours of completion of the job.
31. Supervisor is to submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
32. Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
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.