



Engineer: Tom Urbanek

Cell: 303-241-5331

Date: 1/6/2015

PLUG AND ABANDONMENT PROCEDURE

Harkis 11-2, API: 05-123-21100

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 isolate production equipment and remove any automation prior to rig MIRU.
2. MIRU slickline services. Pull bumper spring and tag bottom. RDMO slickline services.
3. Prepare location for base beam equipped rig. Install perimeter fence as needed.
4. Check and record Braden head pressure. If Braden head valve is not accessible, re-plumb so that valve is above GL. Report any Braden head pressure to engineer.
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 balance plug: 40 sx (9.8 bbls) "G" w/20% silica flour, , 0.4% CD-32, 0.4% ASA-301 and R-3 mixed to 15.8 ppg and 1.38 cu-ft/sk. Cement volume based on 630' in 4 ½" casing.
 - 6.2 Sussex suicide: 60 sx (12.3 bbls) 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 190' in 4 ½" casing and 120' in an 8.5" OH with 20% excess.
 - 6.3 Foxhills plug: 210 sx (49.7 bbls) 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' inside 4 ½" csg, 400' inside 8.5" OH with 20% excess and 200' inside 8 5/8" scsg.
7. TOOH with 2 3/8" tbg. Stand back tbg. Unknown amount, type and length of tbg. Tally tbg.
8. MIRU WL. RIH with gauge ring and junk basket to 7600'. PU 4.5" CIBP and RIH w/WL. Set at +/-7550' to abandon J Sand perfs. Dump bail 2 sx class "G" cement on CIBP. Cannot PT CIBP due to perfs above.
9. PU 4.5" CIBP and RIH w/WL. Set at +/-7090' to abandon Codell perfs, PT to 1000 psi.
10. RIH with 2 3/8" tbg and tag CIBP. PUH 5'.
11. RU Cementers. Pump a 40 sx balance plug from 7085' to 6455' using "G" w/20% silica flour, 0.4% CD-32, 0.4% ASA-301 and R-3 mixed to 15.8 ppg and 1.38 cuft/sx to achieve 3:00 pump time. Plug to cover from 7085' – 6455' in 4 ½" csg.
12. PUH to 6000' and circulate to clear tubing and displace cement and remove all gas from wellbore.
13. POOH with TBG and SB approximately 4000' of tbg.
14. RU WL. Run CBL/CCL from 5800' to surface. Send results to tom.urbanek@anadarko.com and brent.marchant@anadarko.com immediately. Wait on engineering to verify. If CBL

shows cement above 4100', call Tom Urbanek (303-241-5331) for new SX cement procedure.

15. PU two 3 1/8" perf guns, with 3 spf, 120 degree phasing, and 0.59" EHD and RIH w/WL. Shoot 1' of squeeze holes at 4080' and 3960'. RD WL.
16. PU and RIH w/CICR on 2-3/8" tubing, set at ~3990' per CCL. Establish circulation with fresh water containing biocide.
17. RU Cementers. Pump Sussex suicide: 60 sx (12.3 bbls) G" w/0.25 pps cello flake, 0.5% CFR-2, mixed at 15.8 ppg and 1.15 cu-ft/sk. Cement volume based on 190' in 4 1/2" casing and 130' in an 8.5" OH with 20% excess. Under displace by 2 bbls. Disconnect from CICR and dump remaining cement on top.
18. PUH to 3000' and circulate to clear tubing and displace cement.
19. POOH TBG. SB approximately 1400' of TBG, LD remainder.
20. RU WL. Shoot off casing at or below 1300'. RD WL. Circulate casing with water containing biocide to remove any excess gas.
21. NDBOP, NDTH. Install BOP on casing head with 4 1/2" pipe rams.
22. TOOH 4.5" casing, LD. Replace 2 3/8" pipe rams.
23. RIH with 2 3/8" tubing to +/- 1400'.
24. RU cementers. Precede cement with 10 bbl SAPP and a 20 bbl (minimum) fresh water spacer.
25. Pump Foxhills plug: 10 bbl SAPP, 20 bbl (min) water with biocide spacer followed by 210 sx (49.7 bbls) 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' inside 4 1/2" csg, 400' inside 8.5" OH with 20% excess and 200' inside 8 5/8" scsg.
26. PUH to 500' and circulate clean. TOOH and WOC per cement company recommendations.
27. RIH with 2 3/8" tubing and tag cement at or above 700'. If not consult with Evans Engineering. POOH and LD.
28. RU WL. PU 8 5/8" 24# CIBP and RIH to 80'. Set and PT to 1000 psi for 15 minutes. If tests, RDMO WL and WO rig.
29. 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.
30. Supervisor is to submit paper copies of all invoices, logs, and reports to Joleen Kramer.
31. Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
32. Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
33. Welder cut casing minimum 5' below ground level.
34. Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
35. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
36. Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
37. Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
38. Back fill hole with fill. Clean location, level.