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## PLUG AND ABANDONMENT PROCEDURE

### HSR-MCDANIELS 4-22, API 05-123-16638

#### 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. Attempt to pull bumper spring and tag bottom (operations report dated 2/6/2012 shows suspected broken bumper spring). RDMO slickline services.
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 biocide treated water. NDWH. NUBOP. Unseat landing jt, LD.
6. Notify cementers to be on call. Provide volumes listed below:
  - 6.1 Niobrara plug: 25 sx (35 cu-ft) "G" w/ 20% silica flour, 0.4% CD-32, 0.4 ASA-301 and R-3 to achieve 2:30 pump time, mixed at 15.8 ppg and 1.38 cu-ft/sk yield. Cement volume based on 400' in 4 1/2" casing.
  - 6.2 Sussex plug: 40 sx (46 cu-ft) "G" w/ 0.4% CD-32, 0.4% ASA-301, mixed at 15.8 ppg and 1.15 cu-ft/sk yield. Cement volume based on 530' in 4 1/2" casing.
  - 6.3 Foxhills plug: 210 sx (279 cu-ft) Type III w/cello flake and CaCl<sub>2</sub> as necessary, mixed at 14.8 ppg and 1.33 cu-ft/sk yield. Cement volume based on 100' in 4 1/2" casing, 305' in a 10" OH with 20% excess, and 200' in 8 5/8" casing. Caliper on file.
7. TOOH 2 3/8" tubing landed at 7030'. Stand back 2 3/8" tubing.
8. MIRU WL. RIH gauge ring for 4 1/2" 11.6# casing to 6750'. POOH.
9. PU 4 1/2" 11.6# CIBP and RIH with WL. Set at +/- 6740' to abandon Niobrara and Codell perms. PT to 1000 psi for 15 minutes. RDMO WL.
10. RIH with 2 3/8" tubing to +/- 6740', tag CIBP and PUH 5'. Hydrotest tubing to 3000 psi while RIH.
11. MIRU cementers. Pump Niobrara plug: 25 sx (35 cu-ft) "G" w/ 20% silica flour, 0.4% CD-32, 0.4 ASA-301 and R-3 to achieve 2:30 pump time, mixed at 15.8 ppg and 1.38 cu-ft/sk yield. Plug to cover 6340' – 6740'.
12. PUH to +/- 6100'. Reverse circulate with biocide treated water to displace cement and clear tubing.
13. PUH to +/- 4300'.
14. RU cementers. Pump Sussex plug: 40 sx (46 cu-ft) "G" w/ 0.4% CD-32, 0.4% ASA-301, mixed at 15.8 ppg and 1.15 cu-ft/sk yield. Plug to cover 3770' – 4300'. RDMO cementers.
15. PUH to +/- 3600'. Reverse circulate with biocide treated water to displace cement and clear tubing.

TOC – 3670'

NB Top – 6784', SX Top – 3974', FHM – 769'

Offset to Merlin 13-15HZ Pad in Top Gun Campaign

Crops

Gyro Completed 12/21/2013

No Know Casing Issues

16. WOC per cement company recommendation. Tag cement at or above 3770'. If not, consult with Evans Engineering.
17. POOH. Stand back 970' of tubing.
18. MIRU WL. Shoot off 4 ½" casing at or below 870'. RDMO WL. Circulate casing with biocide treated water to remove any gas.
19. NDBOP, NDTH.
20. Install BOP on casing head with 4 ½" pipe rams.
21. TOOH 4 ½" casing, LD.
22. RIH with 2 3/8" tubing to 970' inside 4 ½" casing.
23. MIRU 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: 210 sx (279 cu-ft) Type III w/ cello flake and CaCl<sub>2</sub> as necessary, mixed at 14.8 ppg and 1.33 cu-ft/sk yield. Plug to cover 970' – 870' in 4 ½" casing, 870' – 565' in 10" OH with 20% excess, and 565' – 365' in 8 5/8" casing. Caliper readings across entire interval. RDMO cementers.
24. PUH to 100' and circulate with biocide treated water to displace cement and clear tubing.
25. WOC per cement company recommendation. Tag cement at or above 465'. If not, consult with Evans Engineering.
26. MIRU 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.
27. Instruct cementing and wireline contractors to email copies of all job logs/jobs summaries to [rscDJVendors@anadarko.com](mailto:rscDJVendors@anadarko.com) within 24 hours of completion of the job.
28. Supervisor is to submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
29. Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
30. Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
31. Welder cut casing minimum 5' below ground level.
32. Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
33. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
34. Obtain GPS location data as per COGCC Rule 215 and send to [rscDJVendors@anadarko.com](mailto:rscDJVendors@anadarko.com).
35. Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
36. Back fill hole with fill. Clean location, level.

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