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## **PLUG AND ABANDONMENT PROCEDURE**

### **OLANDER 2, API 05-123-10228**

#### **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 IOC (970-506-5980) 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.
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: **100 sx** (171 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 410' in 4 1/2" casing, plus 220' in a 9 1/2" OH with 40% excess. Nearest caliper reading at 7100'.
  - 6.2 Sussex suicide: **640 sx** (736 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 1050' in 4 1/2" casing and 890' in an 11" OH with 20% excess. Caliper on file.
  - 6.3 Foxhills plug: **440 sx** (585 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. Cement volume based on 100' in an 11" OH annulus with 40% excess, 458' a in 11" OH with 40% excess and 202' in 8 5/8" casing. Nearest caliper measurement at 4200'.
7. TOOH 253 joints of 2 3/8" tubing landed at 7841'. Stand back tubing.
8. PU 4 1/2" scraper and RIH on 2 3/8" tubing to 7840'. TOOH and LD scraper.
9. MIRU WL. PU 4 1/2" CIBP and RIH w/WL. Set at +/-7800' to abandon J Sand perfs. Dump bail 2 sx class "G" cement on CIBP. Cannot PT CIBP due to perfs above.
10. PU 4 1/2" CIBP and RIH w/WL. Set at +/-7080' to abandon Niobrara perfs, PT to 1000 psi. Dump bail 2 sx class "G" cement on CIBP.
11. RIH with 2 3/8" to 1500' and circulate hole to remove all excess gas. TOOH.
12. RU WL. Run CBL from CIBP to surface. Send results to [jade.patterson@anadarko.com](mailto:jade.patterson@anadarko.com) and [brent.marchant@anadarko.com](mailto:brent.marchant@anadarko.com) immediately (perforation and setting depths may change based on results). If CBL shows good cement at or above 6830', then pump a 25 sack balance plug from 7080' to 6730' using "G" w/20% silica flour, 0.4% CD-32, 0.4% ASA-301 and R-3 to achieve 2:30 pump time and skip to step 16.

13. 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 6860' and 6640'. RD WL.
14. PU and RIH w/CICR on 2 3/8" tubing, set at ~6670' per CCL. Establish circulation with fresh water containing biocide.
15. RU cementers. Pump Niobrara suicide: 100 sx (171 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 placing cement between perfs from 6860'-6640'. Under displace and sting out of CICR to leave 3 bbls on top of retainer. RD cementers. Plug to cover from 6860'-6450' in 4 1/2" casing and 6860'-6640' in a 9 1/2" OH with 40% excess. Nearest caliper reading at 7100'.
16. PUH to 6000' and circulate to clear tubing and displace cement.
17. P&SB 4110', LD remainder.
18. RU WL. PU two 3 1/8" perf guns, with 3spf, 120 degree phasing and 0.59" EHD. Shoot 1' squeeze holes at 4970' and 4080'. RD WL.
19. PU and RIH w/CICR on 2 3/8" tubing, set at ~4110' per CCL. Establish circulation with fresh water containing biocide.
20. RU Cementers. Precede cement with 5 bbl water w/biocide, 20 bbl sodium metasilicate, and another 5 bbl water spacer.
21. Pump Sussex suicide: 640 sx (736 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 perfs from 4970' to 4080'. Under displace and sting out of CICR to leave 3 bbls on top of retainer. RD cementers. Plug to cover from 4970'-4080' in an 11" OH with 20% excess and 4970'-3920' in 4 1/2" casing. Caliper on file.
22. PUH to 3700' and circulate to clear tubing and displace cement.
23. P&SB 1070', LD remainder.
24. RU WL. Shoot off casing at or below 970'. RD WL. Circulate casing with water containing biocide to remove any excess gas.
25. NDBOP, NDTH. Install BOP on casing head with 4 1/2" pipe rams.
26. TOOH 4 1/2" casing, LD. Replace 2 3/8" pipe rams.
27. RIH with 2 3/8" tubing to +/- 1070'.
28. RU cementers. Precede cement with 10 bbl SAPP and a 20 bbl (minimum) fresh water spacer.
29. Pump Foxhills plug: 440sx (585 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. Plug to cover from 1070'-970' in an 11" OH annulus with 40% excess, 970'-512' in an 11" OH with 40% excess, and 512'-310' in 8 5/8" casing. Nearest caliper reading was at 4200'.
30. PUH to 100' and circulate clean. TOOH and WOC per cement company recommendations.
31. RIH with 2 3/8" tubing and tag cement at or above 310'. If not consult with Evans Engineering. POOH and LD.
32. 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.
33. 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.
34. Supervisor is to submit paper copies of all invoices, logs, and reports to Joleen Kramer.
35. Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.

36. Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
37. Welder cut casing minimum 5' below ground level.
38. Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
39. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
40. Obtain GPS location data as per COGCC Rule 215 and send to [rscDJVendors@anadarko.com](mailto:rscDJVendors@anadarko.com).
41. Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
42. Back fill hole with fill. Clean location, level.