

Engineer: Tod Haanes  
Cell: 303-929-2339

## PLUG and ABANDONMENT PROCEDURE

### ELKHORN CO 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.). 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. Pull bumper spring and tag bottom. Record tag depth in Open Wells. 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 2/27/2013 recorded a Bradenhead pressure of 0 to 0 psi, and no liquids.
5. **Blow-down bradenhead and re-check pressure the next day.** Repeat until pressure stays at 0 psi. Contact Evans Engineering if pressure does not report at 0 psi the next day.
6. MIRU WO rig. Kill well as necessary using clean fresh water with biocide. ND WH. NU BOP. *Release PKR* (a PKR is reported to be at 7109'). Unseat landing joint, and LD.
7. TOO, SB all 2-3/8" tubing, and LD PKR. Have the PKR re-dressed at the shop where it was rented.
8. PU scraper and RIH to 8029' for 4-1/2" 11.6 lb/ft casing. TOO, SB 7570' of 2-3/8" tubing, and LD scraper.
9. RU WL. PU 4-1/2" 11.6 lb/ft CIBP and set at 8010' (no available collar data) to abandon the J-Sand perfs.
10. PU dump bailer and spot 2 sxs of "G" cement on the CIBP at 8010'.
11. PU another 4-1/2" 11.6 lb/ft CIBP and set at 7570' (collars are located at 7556' and 7590') to abandon the Codell perfs. RD WL.
12. RU hydrotesters. While hydrotesting tubing to 3000 psi, TIH with 2-3/8" tubing to 7570'. RD hydrotesters.
13. Pressure test CIBP to 500 psi for 15 minutes. Squeeze holes are located from 7310'-7311'. **Monitor bradenhead pressure during test. Contact Evans Engineering if the bradenhead pressure is affected by the casing test.**
14. RU cementers. **Pump Niobrara plug:** 40 sxs (61 cf) Thermal 35 +0.5% CFR-2+0.25% FMC, mixed at 15.6 ppg & 1.51 cf/sk. The plug will cover 7570' to 6870'. Volume is based on 700' inside 4-1/2" production casing with no excess. RD cementers.
15. Slowly pull out of the cement and PUH to 6600'. Reverse circulate to ensure no cement is left in the tubing. TOO and SB 4280' of 2-3/8" tubing.
16. RU WL. PU and RIH with two 3-1/8" perf guns with 3 spf, 0.50" EHD, 120° phasing. Shoot 1' of squeeze holes at 5150' and 2' at 4250'. RD WL.
17. RU 4-1/2" CICR and RIH on 2-3/8" tubing to set CICR at 4280'.
18. RU Cementers. Establish circulation through squeeze holes and pump 5 bbls water with biocide, 20 bbls sodium metasilicate, and another 5 bbls spacer immediately preceding cement. **Pump Sussex suicide squeeze:** 540 sxs (621 cf) 0:1:0 'G'+0.5% CFR-2+0.2% FMC+0.5% LWA+0.25 lb/sk Polyflake, mixed at 15.8 ppg & 1.15 cf/sk. Under-displace by 2.3 bbls and un-sting from CICR

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- spotting a minimum 100' of cement covering the squeeze holes. The plug will cover 5150' - 4140'. Volume is based on 900' in 10.5" OH from caliper with 20% excess, and 1010' in 4-1/2" production casing with no excess. RD cementers.
19. Slowly pull out of the cement and PUH to 3900'. Circulate tubing clean to ensure no cement is left in the tubing. TOOH and SB 1400' 2-3/8" tubing.
  20. RU WL. RIH and cut 4-1/2" casing at 1300'. RD WL.
  21. Circulate with fresh water containing biocide to remove any gas.
  22. Un-land casing. ND BOP. ND TH. Install BOP on casing head with 4-1/2" pipe rams.
  23. TOOH and LD 1300' of 4-1/2" casing. Remove 4-1/2" pipe rams and install 2-3/8" pipe rams.
  24. RIH with 2-3/8" tubing to 1400'.
  25. Establish circulation with biocide treated water and get bottoms up.
  26. RU Cementers. Precede cement with 10 bbl (min) SAPP followed by a 20 bbl fresh water spacer.  
**Pump Stub Plug:** 460 sxs (612 cf) Type III+0.3% CFL-3+0.3% CFR-2+0.25 lb/sk Polyflake, mixed at 14.8 ppg & 1.33 cf/sk (100' in 4-1/2" production casing with no excess, 642' in 10.5" OH from caliper with 40% excess, and 174' in 8-5/8" surface casing with no excess). The plug will cover 1400' - 484'. RD cementers.
  27. Slowly pull out of the cement and PUH to 200'. Reverse circulate to ensure no cement is left in the tubing. PUH to 100' and WOC.
  28. WOC per cement company recommendation. Tag cement. Cement top needs to be at or above 558' (100' above the surface casing shoe located at 658'). TOOH.
  29. RU WL. RIH 8-5/8" CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. RDMO WL and WO rig.
  30. Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to [rscDJVendors@anadarko.com](mailto:rscDJVendors@anadarko.com) within 24 hours of completion of the job.
  31. Supervisor 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 flow lines.
  33. Excavate hole around surface casing enough to allow welder to cut casing a 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](mailto:rscDJVendors@anadarko.com).
  38. Properly abandon flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.
  39. Back fill hole with fill. Clean location, and level.
  40. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.