

Engineer: Tod Haanes

Cell: 303-929-2339

## PLUG and ABANDONMENT PROCEDURE

### SHUTT 9-18

#### 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. Arrange for 87 bbls of 9.0 mud to be used prior to the stub plug.
3. MIRU slickline. Pull bumper spring and tag bottom. Enter tagged depth into Open wells. RD slickline.
4. Prepare location for base beam equipped rig. Install perimeter fence as needed.
5. 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 8/14/2015 recorded a Bradenhead pressure of 127 to 86 psi, 35 gallons of liquid was produced, and buildup to 136 psi occurred in 15 minutes.
6. *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.
7. MIRU WO rig. Kill well as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing joint, and LD.
8. TOOH, and SB 7050' of 2-3/8" tubing.
9. RU WL. PU gauge ring and RIH to 7455' for 4-1/2" 11.6 lb/ft casing (spud date = 4/8/2003). POOH and LD gauge ring. *NOTE: A CIBP will be set at 7450', and the 2-7/8" Liner TOP is located at 7459'.*
10. PU 4-1/2" 11.6 lb/ft CIBP and set at 7450' (the lowest collar on the CBL is at 7443') to abandon the J-Sand perfs. PU dump bailer and spot 2 sxs of "G" cement on the CIBP at 7450'.
11. PU another 4-1/2" 11.6 lb/ft CIBP and set at 7050' (collars at 7019' and 7062') to abandon the Nio-Codell perfs. RD WL.
12. RU hydrotesters. TIH with 2-3/8" tubing to 7050' while hydrotesting to 3000 psi. PU 5', circulate gas out of the hole, and pressure test CIBP to 1000 psi for 15 minutes. RD hydrotesters. *Monitor bradenhead pressure during test. Contact Evans Engineering if the bradenhead pressure is affected by the casing test.*
13. RU cementers. Pump Niobrara plug: 25 sxs (38 cf) Thermal 35 +0.5% CFR-2+0.25% FMC, mixed at 15.6 ppg & 1.51 cf/sk. The plug will cover 7050' to 6610'. Volume is based on 440' inside 4-1/2" production casing with no excess. RD cementers.
14. Slowly pull out of the cement and PUH to 6400'. Reverse circulate to ensure no cement is left in the tubing. TOOH and SB 4130' of tubing.
15. 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 4505' and 2' at 4100'. RD WL.
16. RU 4-1/2" CICR and RIH on 2-3/8" tubing to set CICR at 4130'.
17. 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: 180 sxs (208 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 2.5 bbls and un-sting from CICR spotting a minimum 100' of cement covering the squeeze holes. The plug will cover 4505' -

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- 3972'. Volume is based on 405' in 9" OH from caliper with 20% excess, and 533' in 4-1/2" production casing with no excess. RD cementers.
18. Slowly pull out of the cement and PUH to 3700'. Circulate tubing clean to ensure no cement is left in the tubing. TOOH and SB 1170' 2-3/8" tubing.
  19. RU WL. RIH and cut 4-1/2" casing at 1070'. RD WL.
  20. Circulate with biocide treated fresh water to remove any gas.
  21. Un-land casing. ND BOP. ND TH. Install BOP on casing head with 4-1/2" pipe rams.
  22. TOOH and LD 1070' of 4-1/2" casing. Remove 4-1/2" pipe rams and install 2-3/8" pipe rams.
  23. RIH with 2-3/8" tubing to 1170'.
  24. RU Cementers. Precede cement with 10 bbl (min) SAPP followed by a 20 bbl fresh water spacer. Establish circulation with 9.0 ppg minimum mud and get bottoms up. NOTE: Due to history of bradenhead pressure, it is very important to get all gas out of the hole prior to cementing. Pump Stub Plug: 235 sxs (313 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, 369' in 9" OH from caliper with 40% excess, and 213' in 8-5/8" surface casing with no excess). The plug will cover 1170' - 488'. RD cementers.
  25. Slowly PUH to 300'. Reverse circulate to ensure no cement is left in the tubing. PUH to 200' and WOC.
  26. WOC per cement company recommendation. Tag cement. Cement top needs to be at or above 601' (100' above the surface casing shoe located at 701'). TOOH.
  27. RU WL. RIH 8-5/8" 24# CIBP to 80'. RDMO WL and WO rig.
  28. 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.
  29. Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
  30. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
  31. Capping crew will set and secure night cap on 8 5/8" casing head, restrain the casing head, pressure test CIBP to 500 psi with hydrotest pump, then remove night cap and casing head restraints.
  32. Excavate hole around surface casing enough to allow welder to cut casing a 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](mailto:rscDJVendors@anadarko.com).
  37. Properly abandon flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.
  38. Back fill hole with fill. Clean location, and level.
  39. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.