

Engineer: ELIZABETH HUNT

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## PLUG and ABANDONMENT PROCEDURE

### HSR-CABRAL 16-5A

#### Step Description of Work

1. Provide 48 hr 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 hr prior to rig move. Request they catch and remove the plunger, isolate production equipment and remove any automation prior to MIRU.
2. MIRU Slickline. Pull bumper spring and tag bottom. Record tag depth in Open Wells. Well has gyro from 10/18/2013. RD slickline.
3. Prepare location for base beam equipped rig. Install perimeter fence as needed. Order a minimum of 25 joints additional 2-3/8", 4.7#, J-55 tbg.
4. Check and record bradenhead pressure. If bradenhead valve is not accessible, re-plumb so that valve is above GL. Blow down bradenhead and re-check pressure the next day. Repeat until pressure stays at 0 psi. Contact the on-call engineer if pressure does not blow down to 0 and stay at 0.
5. MIRU WO rig. Kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unland tbg and release packer.
6. TOOH and SB all of 2-3/8" tbg. LD packer.
7. PU bit and scraper for 4-1/2", 11.6# csg and RIH to 7375' (just above 2-7/8" liner top @ 7377'). TOOH, SB 7020' 2-3/8" tbg and LD bit and scraper.
8. MIRU Wireline. RIH with 4-1/2" (11.6#) CIBP and set at +/- 7370' to abandon the J-Sand perfs. TOOH. RIH to dump 2 sx cement on CIBP. TOOH.
9. RIH with 4-1/2" (11.6#) CIBP and set at +/- 7020' to abandon the NB/CD perfs. TOOH. RIH to dump 2 sx cement on CIBP. TOOH. RD WL.
10. Pressure test CIBP to 2000 psi for 15 minutes. If PT fails, contact the on-call engineer.
11. RU hydrotesters. RIH with 2-3/8" tbg OE to 7020' while hydrotesting in to 3000psi. RD hydrotesters. Circulate all gas out of the hole.
12. RU cementers. Pump Niobrara Balance Plug: Pump 25 sxs (39 cf) of Niobrara Balance Plug Blend, assuming 15.8 ppg & 1.55 cf/sk. The plug will cover 6600ft-7020ft. Volume based on 420' above the CIBP inside the 4.5" production casing w/ no excess. RD cementers.
13. Slowly pull out of the cement and PUH to 6300'. Reverse circulate tubing clean to ensure no cement is left in the tubing. TOOH and SB 4030' of 2-3/8" tbg.
14. RU WL. PU and RIH with two 3-1/8" perf guns with 3 spf, min 0.5" EHD, 120° phasing. Shoot 2' of squeeze holes at 4500' and 4' of squeeze holes at 4000'. RD WL.
15. PU and RIH with (4.5" 11.6#) CICR on 2-3/8" tbg. Set CICR at 4030'.
16. Establish circulation to surface with biocide treated fresh water, and pump 200 bbls to clean up hole.
17. RU cementers. Pump Sussex Squeeze: Pump 10 bbls sodium silicate and 5 bbls fresh water followed by 240 sxs (280 cf) with 0.25 lb/sk polyflake, assuming 15.8 ppg & 1.17 cf/sk. Underdisplace by 3 bbls. Volume based on 500' inside 4-1/2" production casing, 500' in the 4-1/2" production casing annulus assuming 12.5" OH from the bit size with 60% excess and 160' on top of the CICR to cover top perfs. RD cementers.
18. Slowly pull out of the cement and PUH to 3600'. Reverse circulate to ensure no cement is left in the tbg.

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19. TOOH and SB 1150' of 2-3/8" tbg. LD remainder.
20. RU WL. RIH and cut 4-1/2" casing at 1050'. RD WL.
21. Circulate with fresh water containing biocide to remove any gas.
22. Un-land casing using a casing spear, not a lifting sub. Max pull shall be 100,000#. If unable to unland, contact Engineering.
23. ND BOP. ND TH. Install BOP on casing head with 4-1/2" pipe rams. Install 5000 psi ball valves on both casing head outlets. Install a choke or choke manifold on one outlet.
24. TOOH and LD 1050' of 4-1/2" casing. Remove 4-1/2" pipe rams and install 2-3/8" pipe rams.
25. RIH with 2-3/8" tbg to 1150'.
26. Establish circulation with biocide treated water, circulate 125 bbls (one hole volume), 10 bbls (minimum) of SAPP, followed by 5 bbls fresh water spacer.
27. RU Cementers. **Pump Stub Plug:** 370 sxs (430 cf) Fox Hills Stub Plug Blend w/ Polyflake, assuming 14.8 ppg and 1.16 cf/sk. Volume is based on 100' in 4-1/2" production casing with no excess, 628' of 12.5" OH from bit size with 60% excess, and 200' in 8-5/8" surface casing with no excess. The plug is designed to cover from 1150' to 222'. RD cementers.
28. Slowly pull out of the cement and PUH to 100'. Reverse circulate tubing clean to ensure no cement is left in the tubing.
29. WOC per cement company recommendation. Tag cement. Cement top needs to be at or above 372'. TOOH.
30. RU WL. RIH with 8-5/8" CIBP (8-5/8", 24# casing) and set at +/- 80. RDMO WL and WO rig.
31. Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@anadarko.com within 24 hrs of completion of the job.
32. Supervisor submit paper copies of all invoices, logs, and reports to Platteville Engineering Specialist.
33. Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
34. 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.
35. Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
36. Welder cut casing minimum 5' below ground level.
37. Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
38. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
39. Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
40. Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
41. Back fill hole with fill. Clean location, level.
42. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.