

Engineer: Chris Cordaro
Cell: 432-209-1371

PLUG and ABANDONMENT PROCEDURE

WARNER 16-14

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.). Notify 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. RDMO 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. Blow down bradenhead and re-check pressure the next day. Repeat until pressure stays at 0 psi.
5. MIRU WO rig and spot in empty pipe trailer. Kill well as necessary using biocide treated fresh water. ND WH. NU BOP. Unland tbg using unlanding joint and LD.
6. TOOH tallying and SB 7240' of 2-3/8" tbg. LD remainder
7. MIRU WL. PU and RIH with (4-1/2", 11.6#) gauge ring to 7950' then POOH. RIH w/ (4-1/2", 11.6#) CIBP on WL and set at 7940' (Collars at 7930' and 7955'). POOH.
8. Dump Bail 2 sxs on CIBP – 15.8 Class G Neat.
9. RIH w/ (4-1/2", 11.6#) CIBP on WL and set at 7240' (Collars at 7220' and 7260'). POOH and RD WL.
10. MIRU Cementers. Niobrara/Codell Balance Plug: Pump minimum of 25 sxs (38 cf, 6.8 bbl) 15.8 ppg & 1.53 cf/sk. Volume based on 438'+ inside 4-1/2" production casing with no excess. Cement will be from 6802' – 7240'. RD Cementers.
11. Slowly pull out of the cement and LD tubing. Reverse circulate tbg clean to ensure no cement is left in the tbg. TOH with remaining tubing and SB 4745'
12. MIRU wireline. RIH with 3-1/8" perf guns with 4 spf, min 0.5" EHD, 90° phasing. Shoot 4' of squeeze holes at 4810'. TOH with Wireline. **Confirm circulation down production casing and up surface casing. If pressure is over 500#, consider using test packer. If no circulation to surface, plan will change to suicide squeeze.** If well has good circulation, RDMO WL.
13. PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 4745'.
14. Establish circulation to around retainer up surface casing with biocide treated fresh water, and pump 200 bbls to clean up hole. If unable to circulate with retainer under 1500#, call engineer.
15. RU Cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump **GAS BLOK Sussex Squeeze:** 110 sx (35 bbl or 197 cf) assuming 12 ppg & 1.79 cf/sk. Slurry could be different– confirm yield, volume, and max pressure before pumping. Confirm circulation with water at 2 bpm. Pump cement at 2 bpm and put 85 sxs (27 bbls) under the retainer leaving **25 sxs (8 bbls) above the retainer.** Sting out and continue pumping remaining cement and displace with water. Volume is based on 65' below the CICR inside 4-1/2", 11.6# production casing with no excess, 400' in the 4-1/2" annulus assuming 7.88" bit size with 60% excess and 335' on top of the CICR to cover Sussex Top. If lose circulation at any point, call engineer.

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16. Slowly pull out of the cement and TOO and LD to 1685'. Reverse circulate to ensure no cement is left in the tbg. RD Cementers.
17. After pumping the squeeze at 4810', SD and WOC at minimum 4 hrs; verify gas migration has been eliminated. If evidence of gas migration or pressure remains, contact engineer.
18. TOO and SB 2-3/8" tbg. LD stinger.
19. RIH and jet cut 4-1/2" casing at 1585'. RDMO WL.
20. Attempt to circulate with biocide treated fresh water to remove any gas.
21. ND BOP. ND TH. Un-land casing using a casing spear, not a lifting sub. Rig max pull shall be 100,000#. Max pull over string weight shall be 50,000#. If unable to unland, contact Engineering.
22. Install BOP on casing head with 4-1/2" pipe rams.
23. TOO and LD all 4-1/2" casing. Remove 4-1/2" pipe rams and install 2-3/8" pipe rams.
24. TIH with 2-3/8" tbg to 1685'.
25. Establish circulation with biocide treated fresh water and pump 200 bbls to clean up hole. Call engineer if any gas is present.
26. RU Cementers. Pump 1st Stage GAS BLOK Stub Plug: Pump 10 bbls (min) SAPP and 5 bbls fresh water spacer followed by 190 sx (218.5 cf, 39 bbl), 14 ppg, & 1.15 cf/sk cement. Slurry could be different yield – confirm yield and volume before pumping. Volume is based on 100' in 4-1/2" production casing with no excess, and 300' in 7-7/8" hole size with 100% excess. The plug will cover 1285'-1685'. RDMO Cementers.
27. Slowly pull out of the cement and TOH to 1200'. Reverse circulate using biocide treated fresh water to ensure the tbg is clean. WOC at minimum 4 hrs; verify gas migration/pressure on surface casing has been eliminated.
28. RU Cementers. Pump 2nd Stage Stub Plug NO Gas Block: Pump 10 bbls (min) SAPP and 5 bbls fresh water spacer followed by 180 sx (279 cf, 49.7 bbl), 14 ppg, & 1.55 cf/sk cement. Slurry could be different yield – confirm yield and volume before pumping. Volume is based on 200' in 8-5/8" surface casing with no excess, and 291' in 7-7/8" hole size with 100% excess. The plug will cover 794'-1285'. RDMO Cementers.
29. Slowly pull out of the cement and TOH to 400'. Reverse circulate using biocide treated fresh water to ensure the tbg is clean. WOC at minimum 4 hrs; verify gas migration/pressure on surface casing has been eliminated.
30. MIRU wireline – tag TOC. Must be 944' or higher. If less, contact engineer.
31. Pressure test to test casing. Test shall be 500psi for 15mins. If well fails pressure test PU TIH with (8-5/8", 24#) packer and set just above cement top. Re-test casing. If casing still fails test, contact engineering.
32. RIH (8-5/8", 24#) CIBP to 80' and set. RDMO WL and WO rig.
33. Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@anadarko.com within 24 hours of completion of the job.
34. Supervisor submit paper copies of all invoices, logs, and reports to Platteville Engineering Specialist.
35. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.

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36. 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.
37. Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level.
38. Welder cut casing minimum 5' below ground level.
39. Fill casing to surface using 4500 psi compressive strength cement (NO gravel).
40. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
41. Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
42. Properly abandon flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.
43. Back fill hole with fill. Clean location, and level.
44. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.