

## PLUG and ABANDONMENT PROCEDURE

### TED ADAMS GAS UNIT 1

Step	Description of Work
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| 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. Well has gyro from 07/07/2014. 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. Spot a min of 25 jts of 2-3/8" 4.7# J-55, EUE tbg. Kill well as necessary using clean fresh water with biocide. ND WH. NU BOP. Unland tbg using unlanding joint and LD.   |
| 6.  | TOOH and SB 7910' 2-3/8" tbg, LD remaining.  |
| 7.  | RIH with (4-1/2", 11.6#) Bit and Scraper on 2-3/8" tbg to 7910'. TOOH, SB 7150' 2-3/8" tbg and LD remaining tbg and bit and scraper.   |
| 8.  | MIRU WL. PU and RIH with (4-1/2", 11.6#) CIBP and set at +/- 7900' to abandon the J Sand perms. POOH. PU and RIH to dump 2 sx cement on CIBP. POOH.  |
| 9.  | PU and RIH with (4-1/2", 11.6#) CIBP and set at +/- 7150' to abandon the Niobrara formation. POOH. RDMO WL.  |
| 10. | TIH with 2-3/8" tbg while hydrotesting to 3000 psi to 7150'. Load hole with biocide fresh water and circulate all gas from well. PT CIBP to 500 psi for 15 minutes.  |
| 11. | <u>MIRU cementers.</u> Niobrara/Codell Balance Plug: Pump 25 sxs (39 cf) 15.8 ppg & 1.55 cf/sk. Volume based on 410' inside 4-1/2" production casing. Cement will be from 7150' – 6740'. RD cementers.   |
| 12. | Slowly pull out of the cement and PUH to 6240'. Reverse circulate tubing clean to ensure no cement is left in the tubing.  |
| 13. | TOOH and SB 4370' of 2-3/8" tbg. LD remainder.   |
| 14. | MIRU WL. PU and RIH with two 3-1/8" perf guns with 3 spf, min 0.5" EHD, 120° phasing. Shoot 2' of squeeze at 4820' and 4' of squeeze holes at 4340'. POOH. RDMO WL.  |
| 15. | RIH with (4-1/2" 11.6#) CICR on 2-3/8" tbg. Set CICR at 4370'.   |
| 16. | Establish circulation to surface with biocide treated fresh water, and pump 200 bbls to clean up hole.   |
| 17. | <u>RU Cementers.</u> Pump Sussex Squeeze: Pump 10 bbls sodium silicate and 5 bbls fresh water followed 310 sx (366 cf) with 0.25 lb/sk polyflake 15.8 ppg & 1.18 cf/sk. Underdisplace by 3 bbls. Volume is based on 450' below the CICR inside 4-1/2" production casing with no excess, 480' in the 4-1/2" annulus assuming 10.5" bit size with 20% excess and 193' on top of the CICR to cover top perms. RD cementers. |
| 18. | Slowly pull out of the cement and PUH to 3650'. Reverse circulate to ensure no cement is left in the tbg.  |
| 19. | TOOH and SB 1420' 2-3/8" tbg, LD remaining tbg and CICR stinger.   |

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20. MIRU 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 1610' and 4' of squeeze holes at 1390'. POOH. RDMO WL.
21. RIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 1420'.
22. Establish circulation to surface with biocide treated fresh water, and pump 100 bbls to clean up hole.
23. RU Cementers. Pump Fox Hills Squeeze: Pump 10 bbls sodium silicate and 5 bbls fresh water followed by a 2 part job totaling to 160 sx (188 cf) with 0.25 lb/sk polyflake 15.8 ppg & 1.17 cf/sk. Pump 105 sx through CICR, then unsting and place 55 sx on top of the CICR. Volume is based on 190' below the CICR inside 4-1/2" production casing with no excess, 220' in the 4-1/2" annulus assuming 7.88" bit size with 60% excess, and 720' above the CICR with no excess. Design plug top is 700'.
24. Slowly pull out of the cement and PUH to 700'. Reverse circulate to ensure no cement is left in the tbg.
25. TOOH and SB 700' 2-3/8" tbg. LD CICR stinger.
26. MIRU WL. RIH and cut 4-1/2" casing at 390'. RDMO WL.
27. Circulate with fresh water containing biocide to remove any gas.
28. ND BOP. ND TH. Un-land casing using a casing spear, not a lifting sub. Max pull shall be 100,000#. If unable to unland, contact Engineering.
29. Install BOP on casing head with 4-1/2" pipe rams.
30. TOOH and LD all 4-1/2" casing. Remove 4-1/2" pipe rams and install 2-3/8" pipe rams.
31. RIH with 2-3/8" tubing to 700'.
32. Establish circulation with biocide treated fresh water and pump one hole volume (40 bbls). Pump 10 bbls (min) SAPP, followed by 5 bbls fresh water spacer.
33. RU Cementers. Pump Stub Plug: 140 sxs (163 cf) with 0.25 lb/sk Polyflake, 15.8 ppg & 1.16 cf/sk (300' in 4-1/2" production casing with no excess, 180' in 7.88 bit size w/ 60% excess factor, and 120' in 8-5/8" surface casing with no excess). The plug will cover 700' – 100'. RDMO cementers.
34. Slowly pull out of the cement and PUH to 80'. Reverse Circulate using biocide treated fresh water, to ensure the tubing is clean.
35. WOC per cement company recommendation. TIH and tag cement. Cement top needs to be at or above 170' (50' above the surface casing shoe at 220'). Call Engineering if tag is lower than 170'. PU and TOOH.
36. RU WL. RIH (8-5/8", 24#) CIBP to 80'. RDMO WL and WO rig.
37. 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.
38. Supervisor submit paper copies of all invoices, logs, and reports to Platteville Engineering Specialist.
39. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
40. 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.

Engineer: Samantha Tran

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