

PLUG and ABANDONMENT PROCEDURE

Herman L 32-19

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. 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. 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 7310' 2-3/8" tbg. LD Remainder. |
| 7. | PU and RIH with (4.5", 11.6#) Bit and Scraper on 2-3/8" tbg to 7310'.TOOH. |
| 8. | RU WL. PU and RIH with (4.5", 11.6#) CIBP and set at +/- 7300' to abandon the Nio formation/Codell perms. TOOH. RD WL. |
| 9. | TIH with 2-3/8" tbg while hydrotesting to 3000 psi to 7300'. Circulate all gas from well. PT CIBP to 1000 psi for 15 minutes. |
| 10. | <u>RU cementers</u> . Pump Niobrara Balance Plug: Pump 35 sxs (54 cf) 15.8 ppg & 1.55 cf/sk. Volume based on 410' inside 4-1/2" production casing. Cement will be from 7300' – 6680'. RD cementers. |
| 11. | Slowly pull out of the cement and PUH to 6200'. Reverse circulate tubing clean to ensure no cement is left in the tubing. |
| 12. | LD tbg while PUH to 4580'. |
| 13. | Establish circulation to surface with biocide treated fresh water. |
| 14. | <u>RU Cementers</u> . Pump Sussex Balance Plug: Pump 40 sx (47 cf), assuming 15.8 ppg & 1.17 cf/sk. Volume is based on 480' inside 4-1/2" production casing with no excess. Cement will be from 4580' – 4100'. |
| 15. | Slowly pull out of the cement and PUH to 3500'. Reverse circulate to ensure no cement is left in the tbg. |
| 16. | WOC per cement company recommendation. TIH and tag cement. Cement top needs to be at or above 4109' (200' above the SX top at 4309'). Call Engineering if tag is lower than 4109'. |
| 17. | TOOH and SB 1300' 2-3/8" tbg, LD remaining tbg. |
| 18. | RU WL. RIH and cut 4-1/2" casing at 1200'. RD WL. |
| 19. | Circulate with fresh water containing biocide to remove any gas. |
| 20. | Un-land casing using a casing spear, not a lifting sub. Max pull shall be 100,000#. If unable to unland, contact Engineering. |
| 21. | ND BOP. ND TH. Install BOP on casing head with 4-1/2" pipe rams. |
| 22. | TOOH and LD all 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 1300'. |

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24. Establish circulation with biocide treated fresh water and pump one hole volume (130 bbls). Pump 10 bbls (min) SAPP, followed by 5 bbls fresh water spacer.
25. RU Cementers. Pump Stub Plug: 530 sxs (615 cf) with 0.25 lb/sk Polyflake, 15.8 ppg & 1.16 cf/sk (100' in 4-1/2" production casing with no excess, 634' in 7.88 bit size w/ 60% excess factor, and 200' in 8-5/8" surface casing with no excess). The plug will cover 1300' – 366' RD cementers.
26. Slowly pull out of the cement and PUH to 100'. Reverse Circulate using biocide treated fresh water, to ensure the tubing is clean.
27. WOC per cement company recommendation. TIH and tag cement. Cement top needs to be at or above 516' (50' above the surface casing shoe at 566'). Call Engineering if tag is lower than 516'. PU and TOOH.
28. RU WL. RIH 8-5/8" CIBP to 80'. RDMO WL and WO rig.
29. 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.
30. Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
31. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
32. 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.
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.
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.