

Engineer: Tod Haanes

Cell: 303-929-2339

PLUG and ABANDONMENT PROCEDURE

Travelers U 28-13DI

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. *The most recent bailer cleanout to 8045' occurred 3-23-2004.* Run pressure bomb and obtain pressure gradient survey from surface to 8018' (halfway between J Sand perfs) making gradient stops every 1000'. Forward pressure bomb results to Evans Engineering. Note: Do not run the BHP Survey after blowing down or killing the well with fluid.
3. Tag BH depth and run a **VES** GYRO survey from EOT to surface, making stops *every 100'*. Forward GYRO results to Evans Engineering. 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 3/16/2015 recorded a Bradenhead pressure of 15 to 0 psi, and no liquids.
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 7450' 2-3/8" tubing.
9. RU WL. PU gauge ring and RIH to 7970' for 4-1/2" 13.5 lb/ft N-80 casing (spud date = 9/3/1998). POOH and LD gauge ring.
10. With WL, set 4-1/2" CIBP at 7940' (collars are located at 7918' and 7958') to abandon the J Sand perfs. Standby WL.
11. Fill hole and pressure test CIBP to 1000 psi for 15 minutes.
12. Monitor bradenhead pressure during test. Contact Evans Engineering if the bradenhead pressure is affected by the casing test.
13. PU dump bailer and spot 2 sxs of "G" cement on the CIBP at 7940'. RD WL.
14. RU hydrotesters. TIH with 2-3/8" tubing to 7450' while hydrotesting to 3000 psi. RD hydrotesters.
15. RU cementers. **Pump Niobrara balanced plug:** 25 sxs (37 cf) Thermal 35 +0.5% CFR-2+0.25% FMC, mixed at 15.6 ppg & 1.51 cf/sk. The plug will cover 7450' to 7006'. Volume is based on 444' inside 4-1/2" production casing with no excess. RD cementers.
16. Slowly pull out of the cement and PUH to 7006'. Reverse circulate tubing clean to ensure no cement is left in the tubing, and that TOC is below 6960' (annular TOC is at 7006', and squeeze holes will be shot at 6960'). *NOTE: It is not necessary to tag TOC.* TOOH and SB 6830' 2-3/8" tubing.
17. 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 6960' and 2' at 6800'. RD WL.
18. RU 4-1/2" CICR and RIH on 2-3/8" tubing to set CICR at 6830'.

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19. RU Cementers. Establish circulation through squeeze holes. **Pump Niobrara suicide squeeze:** 50 sxs (83 cf) 1:1:3 'Poz G Gel'+20% silica+0.4% CFL-3+0.4% CFR-2+0.1% SMS, mixed at 13.5 ppg & 1.66 cf/sk. Under-displace by 2 bbls and un-sting from CICR spotting at least 100' cement on top of the squeeze holes. The plug will cover 6960' - 6700'. Volume is based on 160' in 8.875" OH from caliper with 20% excess, and 260' in 4-1/2" production casing with no excess. RD cementers.
20. Slowly pull out of the cement and PUH to 6500' and circulate tubing clean to ensure no cement is left in the tubing. PUH to 5170'.
21. RU Cementers. **Pump Sussex balanced plug:** 50 sxs (57 cf) 0:1:0 'G'+0.5% CFR-2+0.2% FMC+0.5% LWA, mixed at 15.8 ppg & 1.15 cf/sk. The plug will cover 5170' - 4490'. Volume is based on 680' in 4-1/2" production casing with no excess. RD cementers. *A DV Tool is located at 5120'.*
22. Slowly pull out of the cement and PUH to 4490'. Reverse circulate tubing clean to ensure no cement is left in the tubing, and that TOC is below 4470' (annular TOC is at 4494', and squeeze holes will be shot at 4470'). *NOTE: It is not necessary to tag TOC.* TOOH and SB 4120' 2-3/8" tubing.
23. 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 4470' and 2' at 4090'. RD WL.
24. RU 4-1/2" CICR and RIH on 2-3/8" tubing to set CICR at 4120'.
25. 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:** 160 sxs (184 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 at least 100' cement on top of the squeeze holes. The plug will cover 4470' - 3950'. Volume is based on 380' in 8.75" OH from caliper with 20% excess, and 520' in 4-1/2" production casing with no excess. RD cementers.
26. 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 1066' 2-3/8" tubing.
27. RU WL. RIH and cut casing at 966'. RD WL.
28. Circulate with fresh water containing biocide to remove any gas.
29. Un-land casing. ND BOP, and ND TH. Install BOP on casing head with 4-1/2" pipe rams.
30. TOOH and LD 966' of 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 1066'.
32. Establish circulation with fresh water containing biocide and get bottoms up.
33. RU Cementers. Precede cement with 10 bbl (min) SAPP followed by a 20 bbl fresh water spacer. **Pump Stub Plug:** 250 sxs (333 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, 434' in 8.75" OH from caliper with 40% excess, and 198' in 8-5/8" surface casing with no excess). The plug will cover 1066' - 334'. RD cementers.
34. Slowly pull out of the cement and PUH to 200'. Reverse circulate tubing clean using fresh water treated with biocide. PUH to 100' and WOC.
35. WOC per cement company recommendation. Tag cement. Cement top needs to be at or above 432' (100' above the surface casing shoe at 532'). TOOH.

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Travelers U 28-13DI

36. Remove casing head and inspect threads on head and surface casing. Clean and dope casing threads. Re-install casing head.
37. MIRU WL. RIH 8-5/8" CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. RDMO WL and WO rig.
38. 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.
39. Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
40. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
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.
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.