PLUG and ABANDONMENT PROCEDURE

Engineer: Tod Haanes
Cell: 303-929-2339

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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.). Call Automation Removal Group at least 24 hours prior to rig move. Request they isolate production equipment and remove any automation prior to rig MIRU.
2. **Contact** ***Big Sky*** to schedule rod-pump pickup for re-build, and ***ATP Oilfield Services*** for rod handling and storage.
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. The last Form 17 test on 11/6/2014 recorded a Bradenhead pressure of 1 to 0 psi, and no liquids.
5. 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.
6. MIRU WO rig *with rod handling equipment*. Control well as necessary with biocide treated fresh water.
7. **Stop** pumping unit with crank arm in the down position, and **set** brake.
8. **Unhang** well, **unseat** rod-pump, and **NU** rod table. TOOH with rod string. While TOOH, visually inspect rods for wear. Detail rod wear in the Open Wells daily summary, including rod number. LD guides, rods, sinker bars, and rod-pump. Send rod-pump in for rebuild. Ensure that rods and equipment are collected and picked up prior to job completion.
9. **ND** rod table. ND WH. NU BOP with 2-3/8" rams.
10. Release tubing anchor/catcher (reported to be at 4692'). Unseat landing joint, and LD.
11. TOOH and SB 5170' of 2-3/8'' tubing. LD the anchor/catcher, perforated pup joint, and mud anchor. *NOTE: the mud anchor is really a gas separator.* Send in anchor/catcher for rebuild. Return the perforated pup joint and mud anchor to A&W.
12. MIRU slickline. Tag bottom. Record tag depth in Open Wells.
13. Run a **VES** GYRO survey from bottom of hole to surface, making stops *every 100'*. Forward GYRO results to Evans Engineering. RD slickline.
14. PU scraper and RIH to 5170' for 5-1/2" 15.5 lb/ft casing. TOOH, SB 4670' of 2-3/8" tubing, and LD scraper.
15. RU WL. PU 5-1/2" 15.5 lb/ft CIBP and set at 5140' (collars are located at 5127' and 5164') to abandon the Shannon perfs.
16. PU dump bailer and spot 2 sxs of "G" cement on the CIBP at 5140'. RD WL.
17. RU hydrotesters. PU 5-1/2" *CICR*, and RIH on 2-3/8" tubing to 4670' while hydrotesting to 3000 psi. Set CICR at 4670' (Sussex production perfs are located from 4720'-4772'). Un-sting from CICR, circulate gas out of the hole, and pressure test *CICR* to 1000 psi for 15 minutes. RD hydrotesters.
18. ***Monitor bradenhead pressure during test. Contact Evans Engineering if the bradenhead pressure is affected by the casing test.***

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19. Sting into the CICR. Establish a rate with biocide treated water into the Sussex perfs. DO NOT *exceed* 2000 psi.
20. RU cementers. **Pump Sussex production-perf squeeze:** 90 sxs (104 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. Pump 50 sxs (57 cf, 10.2 bbls) below the CICR into the production-perfs. Under-displace by 8.2 bbls and un-sting from the CICR spotting a minimum 200' of cement above the Sussex TOP (located at 4570'). TOC inside the 5-1/2" casing should be at 4322'. Volume is based on 50 sxs below the CICR into the Sussex production-perfs, and 348' in 5-1/2" production casing with no excess. RD cementers.
21. Slowly pull out of the cement and PUH to 4100'. Reverse circulate to ensure no cement is left in the tubing. TOOH, SB 1360' 2-3/8" tubing, and LD stinger.
22. RU WL. RIH and cut 5-1/2" casing at 1260'. RD WL.
23. Circulate with fresh water containing biocide to remove any gas.
24. Un-land casing. ND BOP. ND TH. Install BOP on casing head with 5-1/2" pipe rams.
25. TOOH and LD 1260' of 5-1/2" casing. Remove 5-1/2" pipe rams and install 2-3/8" pipe rams.
26. RIH with 2-3/8" tubing to 1360'.
27. Establish circulation with *biocide treated fresh water* and get bottoms up.
28. RU Cementers. Precede cement with 10 bbl (min) SAPP followed by a 20 bbl fresh water spacer. **Pump Stub plug:** 400 sxs (532 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 5-1/2" production casing with no excess, 645' in 9.5" OH from caliper with 40% excess, and 207' in 8-5/8" surface casing with no excess). The plug will cover 1360' - 408'. RD cementers.
29. Slowly PUH to 200'. Reverse circulate to ensure no cement is left in the tubing. PUH to 100' and WOC.
30. WOC per cement company recommendation. Tag cement. TOC must be at or above 515' (100' above the surface casing shoe located at 615'). TOOH.
31. RU WL. RIH 8-5/8" CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. RDMO WL and WO rig.
32. 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.
33. Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
34. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
35. Excavate hole around surface casing enough to allow welder to cut casing a 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 flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.

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41. Back fill hole with fill. Clean location, and level.
42. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.