

## PLUG and ABANDONMENT PROCEDURE

### NIX 14-28

#### 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. NOTE: Casing is 2-7/8", 6.5 lb/ft, J-55.
3. MIRU slickline. Pull bumper spring and tag bottom. Record tag depth in 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 27 to 1 psi, produced 1 gallon of water, and built up to 3 psi in 15 minutes.
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 with 1.66" OD pipe rams. Unseat landing joint, and LD.
8. TOOH and SB 7020' 1.66" OD tubing.
9. PU scraper and RIH to 7020' for 2-7/8" 6.5 lb/ft casing (spud date = 1/21/1994). TOOH, SB 6990' of tubing, and LD scraper.
10. PU CIBP for 2-7/8" casing, and while hydrotesting tubing to 3000 psi, set CIBP at 6990' (collars are located at 6974' and 7008') to abandon the Nio-Codell perms.
11. Fill hole with biocide treated water, circulate gas out of the hole, and pressure test CIBP to 3000 psi for 15 minutes (if this pressure tests, it will not be necessary to Hydrotest the 2-7/8" work string at the stub plug).
12. Monitor bradenhead pressure during test. Contact Evans Engineering if the bradenhead pressure is affected by the casing test.
13. TOOH, SB 6990' of tubing, and LD setting tool.
14. TIH with 1.66" OD tubing to 6990'.
15. RU cementers. Pump Niobrara plug: 20 sxs (30 cf) Thermal 35 +0.5% CFR-2+0.25% FMC, mixed at 15.6 ppg & 1.51 cf/sk. The plug will cover 6990' to 6080'. Volume is based on 910' inside 2-7/8" production casing with no excess. RD cementers.
16. Slowly pull out of the cement and PUH to 5800'. Reverse circulate tubing clean to ensure no cement is left in the tubing. TOOH and SB 4000' 1.66" OD tubing.
17. RU WL. PU and RIH with one 2-1/8" perf gun with 3 spf, 0.42" EHD, 120° phasing. Shoot 2' of squeeze holes at 4340'. RD WL.
18. Establish circulation to surface with biocide treated fresh water. If circulation on the back side is not possible, contact Evans Engineering before proceeding (the 2-7/8" casing may require cutting at 4340' to be used as a work string).
19. RU Cementers. ND BOP and tubing head. Nipple up cement head (plug retainer) in preparation for the wiper plug squeeze.
20. Pump 5 bbls water with biocide, 20 bbls sodium metasilicate, and another 5 bbls spacer immediately preceding cement. Pump Sussex wiper plug squeeze: 190 sxs (219 cf) 0:1:0 'G'+0.5%

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CFR-2+0.2% FMC+0.5% LWA+0.25 lb/sk Polyflake, mixed at 15.8 ppg & 1.15 cf/sk. The plug will cover 4340' - 3922'. Volume is based on 418' in 9.125" OH from caliper with 20% excess, and 418' in 2-7/8" production casing with no excess. Displace wiper plug to 3922'.

21. Nipple down the cement head (plug retainer). RD Cementers. NU tubing head and BOP.
22. WOC per cement company recommendation. TIH with 1.66" OD tubing and tag wiper plug. The top needs to be at or above 3930' (200' above the Sussex TOP of 4130').
23. TOOH and LD 1.66" tubing.
24. RU WL. RIH and cut casing at 880'. RD WL.
25. Circulate with fresh water containing biocide to remove any gas.
26. Un-land casing. ND BOP, and the tubing hanger. Install BOP on casing head with 2-7/8" pipe rams.
27. It is not necessary to Hydrotest the 2-7/8" work string if it pressure tested to 3000 psi.
28. Using 2-7/8" casing as the work string, establish circulation and *get bottoms up* with biocide treated fresh water.
29. RU Cementers. Precede cement with 10 bbl (min) SAPP followed by a 20 bbl fresh water spacer. Pump Stub Plug: 150 sxs (199 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. (225' in 9.0" OH from caliper with 40% excess, and 167' in 8-5/8" surface casing with no excess). The plug will cover 880' - 488'. RD cementers.
30. Slowly pull out of the cement, PUH to 200', and SB 400'. Reverse circulate the 2-7/8" work string clean using biocide treated fresh water.
31. WOC per cement company recommendation. Tag cement. Cement top needs to be at or above 555' (100' above the surface casing shoe located at 655'). TOOH and LD 2-7/8" casing.
32. MIRU WL. RIH 8-5/8" CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. 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](mailto:rscDJVendors@anadarko.com) within 24 hours of completion of the job.
34. Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
35. Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
36. Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level.
37. Welder cut casing minimum 5' below ground level.
38. Fill casing to surface using 4500 psi compressive strength cement (NO gravel).
39. Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
40. Obtain GPS location data as per COGCC Rule 215 and send to [rscDJVendors@anadarko.com](mailto:rscDJVendors@anadarko.com).
41. Properly abandon flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.
42. Back fill hole with fill. Clean location, and level.
43. Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.