

PLUG AND ABANDONMENT PROCEDURE

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PSC 16-4

- | Step | Description of Work |
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| 1 | Provide 48 hr 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 hr prior to rig move. Request they isolate production equipment and remove any automation prior to rig MIRU. |
| 2 | Check and report surface casing pressure. If surface casing is not accessible at ground level, re-plumb so valve is at ground level. |
| 3 | Prepare location for base beam equipped rig. Install perimeter fence as needed. |
| 4 | MIRU slickline services. Pull bumper spring and tag bottom. Run a bottom-hole pressure survey from mid-perf Codell @ 7130' to surface with gradient stops every 1000'. Forward results to Sabrina Frantz in Evans Engineering. RDMO slickline services. NOTE: BHP survey must be completed before well is blown down or killed! |
| 5 | MIRU well service unit, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD. Tbg is landed @ 7099' KB w/ 233 jts. |
| 6 | TOOH and stand back 6810' 2 3/8" tbg. LD remainder. |
| 7 | MIRU WL. RIH gauge ring for 4 1/2" 11.6# casing to 6850'. POH. |
| 8 | RIH 4 1/2" CIBP and set @ 6810' to abandon Codell and Niobrara perms. Pressure test CIBP and casing to 1000 psi for 15 minutes. RDWL. |
| 9 | TIH w 2 3/8" tbg open ended to CIBP at 6810'. Hydro -test tbg to 3000 psi. |
| 10 | RU cementers and equalize a balanced plug above CIBP from 6810' to 6410' as follows: 25 sx "G" w/20% silica flour, 0.4% CD-32, 0.4% ASA-301 and R-3 to achieve 2:30 pump time, mixed at 15.8 ppg and 1.38 cuft/sk. (35 cuft of slurry). |
| 11 | POH 10 stands and circulate tbg clean using fresh water treated with biocide. POH and LD WS to place EOT to 4180'. |
| 12 | RU cementers and equalize a balanced plug from 4180' to 3780' as follows: 30 sx class "G", w/0.4% CD-32, 0.4% ASA-301, and CaCl ₂ as deemed appropriate for 4 hour tag mixed at 15.8 ppg and 1.15 cuft/sk (35 cuft of slurry). |
| 13 | POH to ~3000. Circulate water containing biocide to clear tubing. WOC per cementing company recommendation. |
| 14 | Tag cement @ 3780'. POH and stand back 870' of tbg. |
| 15 | RU WL. Crack coupling or cut casing at 770'. Circulate bottoms up and continue circulating to remove any gas from wellbore. RDMO WL. |

- 16 ND BOP and wellhead. Install BOP on surface casing head with 4 1/2" pipe rams. Install 3000 psi ball valves on both casing head outlets. Install a choke or choke manifold on one outlet.
- 17 TOOH and LD 4 1/2" casing. Change pipe rams to 2 3/8".
- 18 RIH with 2 3/8" tubing open-ended to 870' (100' inside 4 1/2" stub).
- 19 RU cementers. Establish circulation and pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
- 20 Pump balanced Stub Plug: 180 sx Type III w/0 .25#/sk cello flake and CaCl₂ as deemed necessary mixed at 14.8 ppg and 1.33 cf/sx (240 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 200' in 8 5/8" csg, and 220' in 9 1/2" OH + 40% excess.
- 21 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 450'. If not, consult Evans Engineering.
- 22 MIRU WL. RIH 8 5/8" CIBP to 80'. Set and PT to 1000 psi for 15 min. If tests, RDMO WL and WO rig.
- 23 Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@anadarko.com within 24 hrs of completion of the job.
- 24 Supervisor submit paper copies of all invoices, logs, and reports to the Evans Engineering Specialist group.
- 25 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 26 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 27 Welder cut 8 5/8" casing minimum 5' below ground level.
- 28 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 29 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 30 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 31 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 32 Back fill hole with fill. Clean location, level.
- 33 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.