

## PLUG AND ABANDONMENT PROCEDURE

RADEMACHER 12-30

- | 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 IOC (970-506-5980) at least 24 hr prior to rig move. Request they catch and remove plunger, isolate production equipment and remove any automation prior to rig MIRU. |
| 2    | MIRU slickline services. Pull bumper spring and tag bottom.  |
| 3    | Check and report surface casing pressure. If surface casing is not accessible at ground level, re-plumb so valve is at ground level.   |
| 4    | Prepare location for base beam equipped rig. Install perimeter fence as needed.  |
| 5    | MIRU, kill well as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt.   |
| 6    | TOOH and stand back 2.063" IJ tbgs: 219 jts landed @ 7174'   |
| 7    | MIRU Warrior WL. PU gauge ring for 3 1/2" 7.7# csg. RIH to 6950'.  |
| 8    | RIH 3 1/2" CIBP and set at 6920' to isolate Cd/Nb perms. PT Casing to 1000 psi for 15 minutes. RDWL.   |
| 9    | TIH w/ 2 .063" tbgs open-ended to CIBP at 6920'. Hydro-test tbgs to 3000 psi.  |
| 10   | RU cementers and equalize a balanced plug above CIBP from 6920' to 6390' as follows: 20 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. (28 cuft of slurry).  |
| 11   | POH 10 stands and circulate tbgs clean using fresh water treated with biocide. POH and LD WS to bring EOT to 4950'.  |
| 12   | RU cementers and equalize a balanced plug from 4950' to 3830' as follows: 50 sx class "G", w/0.4% CD-32, 0.4% ASA-301, and CaCl <sub>2</sub> as deemed appropriate mixed at 15.8 ppg and 1.15 cuft/sk (58 cuft of slurry).   |
| 13   | POH to ~3000. Circulate water containing biocide to clear tubing. WOC per cementing company recommendation.  |
| 14   | Tag cement @ 3830'. POH and stand back 940' of tbgs.   |
| 15   | ND BOP and wellhead. Install BOP on surface casing head with 3 1/2" pipe rams. Install 3000 psi ball valves on both casing head outlets. Install a choke or choke manifold on one outlet.  |
| 16   | RU WL. Crack coupling or cut casing at 940'. RDMO WL. Circulate bottoms up and continue circulating to remove any gas from wellbore.   |
| 17   | TOOH and LD 940' of 3 1/2" casing.   |

- 18 RIH with tubing open-ended to 940' (3 1/2" stub).
- 19 RU cementers. 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 CaCl<sub>2</sub> as deemed necessary mixed at 14.8 ppg and 1.33 cf/sx (239 cuft of slurry). Cement volume based on 200' in 8 5/8" csg, and 200' in 10" OH + 40% excess.
- 21 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 642'. 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 Joleen Kramer.
- 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.

Engineer: David Dalton  
Cell: 970-590-6245