

## PLUG AND ABANDONMENT PROCEDURE

OSTER 15-11

- | Step | Description of Work  |
|------|--|
| 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. Reuest they catch and remove plunger, isolate production equipment and remove any automation prior to rig MIRU.  |
| 2    | MIRU slickline services and pressure bomb services. Pull bumper spring, tag bottom, and run pressure bomb survey and obtain pressure gradient survey from surface to 7186' making gradient stops every 1000'. Forward pressure bomb results to Evans Engineering. RDMO pressure bomb services. MIRU VES and run gyro survey from EOT to surface with stops every 100'. Forward gyro survey data and invoices to Sabrina Frantz. RDMO slickline services and VES. |
| 3    | Check and record Bradenhead pressure. If Bradenhead valve is not accessible, re-plumb so that valve is above GL. Report pressures in Openwells and notify Reed Boeger and Brent Marchant immediately.  |
| 4    | Prepare location for base beam equipped rig. Install perimeter fence as needed.  |
| 5    | MIRU workover rig. Circulate well with water w/ biocide to kill the well and remove all gas to prepare well for CBL. ND wellhead. NU BOPs. Unseat landing jt.  |
| 6    | POOH and stand back 2-3/8" tbg. (225 jnts landed at 7167')   |
| 7    | MIRU WL. RIH w/gauge ring for 4.5" 15.1# csg to 7150'.   |
| 8    | RIH with 4-1/2" CIBP and Set at 7090'. PT csg to 1000 psi for 15 minutes. PU dump bailer and 2 sx cement and RIH to place on top CIBP at 7090'.  |
| 9    | Ensure hole is full of fresh water w/ biocide. Consider TIH to circulate any gas out of hole to prepare well for CBL.  |
| 10   | RIH with CBL and log from 7100' to surface. Forward results immediately to Reed.Boeger@Anadarko.com and Brent.Marchant@Anadarko.com in Evans Engineering. (Ensure hole is full of water. If any gas or air is present in the hole, TIH w/ 2-3/8" tubing and circulate gas out and re-run log.  |
| 11   | RIH with 2-1' 3-1/8" perf guns with 3 spf, 0.5" diam, 120 phasing. Shoot 1' of squeeze holes at 6370' and 5970'. RDMO WL   |
| 12   | Notify Cementers to be on call.  |
| 13   | PU 4-1/2" CICR and RIH on 2-3/8" tbg while hydrotesting to 3000 psi. Set CICR at 6010' +/- 10', adjusting to set between joints based on CBL.  |
| 14   | RU Cementers. Establish injection through sqz holes.   |
| 15   | Pump Niobrara Suicide Squeeze: 171 cu-ft (100 sx) 50/50 Poz "G" w/ 20% silica flour, 3% gel, 0.1% sodium metasilicate and 0.4% FL-52. Mixed at 13.5 ppg and 1.71 cuft/ sk yield with 20% excess and 8.25" hole size. Underdisplace by 3 bbls and unsting from CICR spotting at least 100' cement on top of sqz holes. Calculated top of cement in the 4-1/2" csg is 5800'.   |
| 16   | PUH to 5000' and circulate hole clean with fresh water w/ biocide. POOH standing back 128 jts (4030') of 2-3/8" tbg.   |
| 17   | MIRU WL. RIH with 2-1' 3-1/8" perf guns with 3 spf, 0.5" diam, 120 phasing. Shoot 1' of squeeze holes at 4310' and 4010'. Adjust top sqz hole to be ~10' below BOC based on CBL.   |
| 18   | PU 4-1/2" CICR and RIH on 2-3/8" tbg. Set CICR at 4040', adjusting to set between joints based on CBL.   |
| 19   | Establish injection through sqz holes. Pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement.   |

- 20 Pump Sussex Suicide Squeeze: 161 cu-ft (140 sks) "G" w/0.25pps cello flake, 0.4% CD-32, 0.4% ASA-301 with CaCl<sub>2</sub> as necessary. Mixed at 15.8 ppg, 1.15 cuft/sack. Underdisplace by 3 bbls and unsting from CICR spotting at least 100' cement on top of sqz holes. Calculated top of plug is 3820' in the 4-1/2" csg.
- 21 Assuming CBL shows cement to surface, PUH to 960', laying down tbg and circulate hole clean with fresh water w/ biocide. Contact Evans Engineering prior to moving on to next step.
- 22 Pump Fox Hills Balanced Plug: 66.5 cu-ft (50 sx) Type III w/cello flake and CaCl<sub>2</sub> as deemed necessary, mixed at 1.33 cf per sack, 14.8 ppg. Calculated top of cement is 160' based in the 4-1/2" csg.
- 23 PUH to 150' and circulate hole clean with fresh water w/ biocide. POOH and WOC at least 4 hours per cementing company recommendation.
- 24 RIH and tag top of plug. Plug needs to be tagged at 160' or shallower. Contact Reed Boeger in Evans after tag to confirm. POOH and LD 2-3/8" tbg.
- 25 RU wireline. Run and set CIBP in the 4-1/2" 15.1# production casing at 150'. PT CIBP and production casing to 1000 psi for 15 minutes. Assuming successful test, RD wireline.
- 26 RDMO workover rig.
- 27 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.
- 28 Supervisor submit paper copies of all invoices, logs, and reports to Joleen Kramer.
- 29 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 30 Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
- 31 Welder cut casing minimum 5' below ground level.
- 32 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 33 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 34 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 35 Back fill hole with fill. Clean location, level.
- 36 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.

Reed Boeger – Sr. Production Engineer  
970-506-5987 – Office 512-217-1852 – Cell  
Reed.boeger@anadarko.com