

## PLUG AND ABANDONMENT PROCEDURE

### HSR-SPAUR 1-7

- | 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 pull plunger, 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 gyro directional survey from EOT @ 6916' to surface with 100' stations. Run a bottom-hole pressure survey with gradient stops every 1000'. Forward results of both surveys to Sabrina Frantz in Evans Engineering. RDMO slickline services.                      |
| 5    | MIRU, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD. Tbg is landed @ 6916' KB w/ 209 jts.   |
| 6    | TOOH and stand back 6660' 2 3/8" tbg. LD remainder.  |
| 7    | MIRU WL. RIH gauge ring for 4 1/2" 11.6# casing to 6700'. POH.   |
| 8    | RIH 4 1/2" CIBP and set @ 6660' to abandon Codell and Niobrara perfs. Pressure test CIBP and casing to 1000 psi for 15 minutes. RDWL.  |
| 9    | TIH w 2 3/8" tbg open ended to CIBP at 6660'. Hydro -test tbg to 3000 psi.   |
| 10   | RU cementers and equalize a balanced plug above CIBP from 6660' to 6260' 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. TOOH standing back 3820' of tbg.   |
| 12   | RUWL. PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 4200' and 3790'. RDWL.  |
| 13   | PU CICR on 2 3/8" tbg. RIH and set CICR at 3820'.  |
| 14   | RU Cementers. Pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement.  |
| 15   | Pump Sussex Suicide: 190 sx class "G", w/0.25 pps cello flake, 0.4% CD-32, 0.4% ASA-301 mixed at 15.8 ppg and 1.15 cuft/sk (219 cuft of slurry) to place cement between perfs. Underdisplace and sting out of CICR to leave 3 bbls cement on top of retainer. Cement volume based on 9" hole with 20% excess. Caliper log on file. |
| 16   | POH 10 stands. Circulate water containing biocide to clear tubing. POH standing back ~1650' of tbg.  |

- 17 RU WL. Crack coupling or cut casing at 1550'. RDMO WL. Circulate bottoms up and continue circulating to remove any gas from wellbore.
- 18 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.
- 19 TOOH and LD 1540' of 4 1/2" casing.
- 20 RIH with 2 3/8" tubing open-ended to 1650' (100' inside 4 1/2" stub).
- 21 RU cementers. Pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
- 22 Pump balanced Stub Plug: 450 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 (598 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 203' in 8 5/8" csg, and 827' in 9.0" OH + 40% excess.
- 23 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 673'. If not, consult Evans Engineering.
- 24 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.
- 25 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.
- 26 Supervisor submit paper copies of all invoices, logs, and reports to Joleen Kramer.
- 27 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 28 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 29 Welder cut 8 5/8" casing minimum 5' below ground level.
- 30 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 31 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 32 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 33 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 34 Back fill hole with fill. Clean location, level.
- 35 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.

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