

PLUG AND ABANDONMENT PROCEDURE

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PLUTT P 1-13

- | Step | Description of Work |
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| 1 | This well has a history of high Bradenhead pressure. Prior to MIRU, order a 30-day Bradenhead blowdown. Schedule operations to begin immediately after blowdown. |
| 2 | 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. |
| 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 slickline services. Pull bumper spring and tag bottom. Run a gyro directional survey from EOT @ 7212' to surface with 100' stations. Run a bottom-hole pressure survey from mid-perf Codell @ 7238' to surface with gradient stops every 1000'. Forward results of both surveys to Sabrina Frantz in Evans Engineering. RDMO slickline services. NOTE: BHP survey must be completed before well is blown down or killed! |
| 6 | MIRU well service unit, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD. Tbg is landed @ 7212' KB w/ 223 jts. |
| 7 | TOOH and stand back 7170' 2 3/8" tbg. LD remainder. |
| 8 | MIRU WL. RIH gauge ring for 4 1/2" 11.6# casing to 7200'. POH. |
| 9 | RIH 4 1/2" CIBP and set @ 7170' to abandon Codell perfs. Pressure test CIBP and casing to 1000 psi for 15 minutes. RDWL. |
| 10 | TIH w 2 3/8" tbg open ended to CIBP at 7170'. Hydro -test tbg to 3000 psi. |
| 11 | RU cementers and equalize a cement plug above CIBP from 7170' to 6620' as follows: 35 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. (48 cuft of slurry). |
| 12 | POH 15 stands and circulate tbg clean using fresh water treated with biocide. TOOH standing back 3980' of tbg. |
| 13 | RUWL. PU 2 - 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 4360' and 2' of squeeze holes at 3950'. RDWL. |
| 14 | PU CICR on 2 3/8" tbg. RIH and set CICR at 3980'. |
| 15 | RU Cementers. Establish circulation and pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement. |
| 16 | Pump Sussex suicide squeeze: 210 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 (242 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 1/2" hole with 20% excess. Caliper log on file. |
| 17 | POH 15 stands. Circulate water containing biocide to clear tubing. POH standing back ~1010' of tbg. |

- 18 RU WL. Cut casing at 910'. Circulate bottoms up and continue circulating to remove any gas from wellbore. RDMO WL. NOTE: Due to a history of Bradenhead pressure it is important to circulate all gas out of the wellbore before cementing.
- 19 ND BOP and tubing head. 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.
- 20 TOOH and LD 4 1/2" casing. Change pipe rams to 2 3/8".
- 21 RIH with 2 3/8" tubing open-ended to 1010' (100' inside 4 1/2" stub).
- 22 RU cementers. Establish circulation with water and pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
- 23 Pump balanced Stub Plug: 250 sx Thixotropic cement mixed at 13.5 ppg and 1.74 cf/sx (435 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 209' in 8 5/8" csg, and 501' in 9 1/2" OH + 40% excess.
- 24 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 309'. If not, consult Evans Engineering.
- 25 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.
- 26 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.
- 27 Supervisor submit paper copies of all invoices, logs, and reports to the Evans Engineering Specialist.
- 28 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 29 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 30 Welder cut 8 5/8" casing minimum 5' below ground level.
- 31 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 32 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 33 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 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.