

PLUG AND ABANDONMENT PROCEDURE

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HSR-HALL 12-31

- | 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. The last Form 17 test on 7/22/2014 recorded Bradenhead pressure of 40 psi, blown down to 1 psi and two gallons of water were produced. Blow down the Bradenhead and re-check pressure the next day. Repeat until pressure stays at 0 psi. Contact Evans Engineering if pressure does not blow down to 0 and stay at 0. |
| 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 @ 7245' to surface with 100' stations. Run a bottom-hole pressure survey from mid-perf Codell @ 7280' 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! |
| 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 @ 7245' KB w/ 221 jts. |
| 6 | TOOH and stand back 6920' 2 3/8" tbg. LD remainder. |
| 7 | MIRU WL. RIH gauge ring for 4 1/2" 11.6# casing to 6970'. POH. |
| 8 | RIH 4 1/2" CIBP and set @ 6920' 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 6920'. Hydro -test tbg to 3000 psi. |
| 10 | RU cementers and equalize a cement plug above CIBP from 6920' to 6500' as follows: 25 sx Thermal 35 + 0.3% CFR-2 + 0.3% ASM-3, mixed at 15.8 ppg and 1.51 cuft/sk. (38 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 4900'. |
| 12 | RU cementers and equalize a balanced plug from 4900' to 4510' as follows: 30 sx class "G" + 0.5% CFR-2 + 0.2% FMC + 0.5% LWA, mixed at 15.8 ppg and 1.15 cuft/sk (34 cuft of slurry). |
| 13 | POH to 3000'. Circulate water containing biocide to clear tubing and casing for Sussex squeeze job to follow. POH 10 stands and WOC per cementing company recommendation. |
| 14 | Tag cement @ 4560' or higher. If not, consult Evans Engineering. POH and stand back 1040' of tbg. |

- 15 RU WL. Cut casing at 940'. Circulate bottoms up and continue circulating to remove any gas from wellbore. RDMO WL.
- 16 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.
- 17 TOO H and LD 4 1/2" casing. Change pipe rams to 2 3/8".
- 18 RIH with 2 3/8" tubing open-ended to 1040' (100' inside 4 1/2" stub).
- 19 Establish circulation and get bottoms up to remove gas from wellbore.
- 20 RU cementers and pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
- 21 Pump balanced Stub Plug from 1040' - 240': 340 sx Type III + 0.3% CFL-3 + 0.3% CFR-2 + 1% CACL2 + 0.25#/sk Polyflake mixed at 14.8 ppg and 1.34 cf/sx (456 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 206' in 8 5/8" csg, and 494' in 10 1/2" OH + 20% excess. Caliper log on file.
- 22 TOO H. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 346'. If not, consult Evans Engineering.
- 23 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.
- 24 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.
- 25 Supervisor submit paper copies of all invoices, logs, and reports to the Evans Engineering Specialist.
- 26 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 27 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 28 Welder cut 8 5/8" casing minimum 5' below ground level.
- 29 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 30 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 31 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 32 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 33 Back fill hole with fill. Clean location, level.
- 34 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.