

PLUG AND ABANDONMENT PROCEDURE

HSR-GRAHAM 2-36

- | 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. Run a Gyro directional survey from EOT @ 7257' KB to surface with 100' stations. Forward results to Sabrina Frantz in Evans. Run a pressure survey from mid-perf of Codell @ 7290' to surface with 1000' gradient stops. RDMO slickline services. |
| 3 | Prepare location for base beam equipped rig. Install perimeter fence as needed. |
| 4 | MIRU, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD. |
| 5 | TOOH and stand back 2 3/8" production tubing (231 jts landed @ 7257'). . |
| 6 | PU scraper for 4 1/2" 11.6# casng. TIH on 2 3/8" tbg to 6950'. TOH, standing back tbg. LD scraper. |
| 7 | MIRU WL. . RIH CIBP w/ WL. Set at 6900'. Run CBL from CIBP to surface to verify coverage of remedial cement. NOTE: squeezed holes between 1850' and 4760'. Forward results to Evans Engineering. Pressure test casing to 500 psi for 15 minutes. RDWL. |
| 8 | TIH w 2 3/8" tbg open ended to CIBP at 6900'. Hydro -test tbg to 3000 psi. |
| 9 | RU cementers and equalize a balanced plug above CIBP from 6900' to 6500' 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). |
| 10 | POH 25 stands and circulate tbg clean using fresh water treated with biocide. POH standing back 4810' of tbg. |
| 11 | PU 2 - 1' 3-1/8" perf guns with 3 spf, 0.5" dia 120° phasing. Shoot 1' of squeeze holes at 4980' and 4780'. Adjust depth of perms as needed per CBL. RDWL. |
| 12 | PU CICR on 2 3/8" tbg. RIH and set CICR at 4810'. |
| 13 | RU Cementers. Pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement. |
| 14 | Pump SX Suicide: 150 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 (172 cuft of slurry) to place suicide squeeze between perms. Underdisplace and sting out of CICR to pump 15 bbls cement on top of retainer (to fill casing 4810'-4000'). Cement volume based on 9" hole with 20% excess. Caliper log on file. |

- 15 POH 20 stands. Circulate water containing biocide to clear tubing. POH standing back ~1130' of tbg.
- 16 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.
- 17 RU WL. Crack coupling or cut casing at 1030'. RDMO WL. Circulate bottoms up and continue circulating to remove any gas from wellbore.
- 18 TOOH and LD 1030' of 4 1/2" casing.
- 19 RIH with 2 3/8" tubing open-ended to 1130' (100' inside 4 1/2" stub).
- 20 RU Cementers. Pump balanced Stub Plug: 270 sx Type III w/0 .25#/sk cello flake and CaCl₂ as deemed necessary mixed at 14.8 ppg and 1.33 cf/sx (359 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 204' in 8 5/8" csg, and 586' in 8 1/2" OH + 20% excess.
- 21 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 344'. 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.

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