

PLUG AND ABANDONMENT PROCEDURE

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EICHTHALER MARGARET 1

- | 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. Last Bradenhead test 8/12/2015 recorded pressure of 1 psi, blown down to 0. 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. Control well as necessary with biocide-treated water. ND WH. NU BOP. Unseat landing jt. 2 3/8" tbg is landed @ 7013' with 222 joints. NOTE: Collapsed casing reported @ 7030'-7055' 3/11/2014. |
| 5 | TOH and stand back tbg. |
| 6 | PU scraper for 4 1/2" 11.6# casing and TIH to 7020'. TOH and SB tbg. LD scraper. |
| 7 | PU and RIH 4 1/2" 11.6# packer to 7000'. Hydro-test tbg to 3000 psi on TIH. Set pkr and test backside to 500 psi. |
| 8 | Establish injection rate down tubing with max pressure 1000 psi. |
| 9 | Release pkr and TOH standing back tbg. LD pkr. |
| 10 | PU 4 1/2" CICR on 2 3/8". TIH and set @ 7000'. |
| 11 | MIRU cementers and squeeze cement to abandon all zones below CICR: 75 sx 1:1:3 "POZ:G:Gel" + 20% silica + 0.4% CFL-3 + 0.4% CFR-2 + 0.1% SMS mixed at 13.5 ppg and 1.66 cuft/sk (125 cf of slurry). Underdisplace and sting out of CICR to leave 7 bbls cement on top of retainer 7000' - 6525'. |
| 12 | TOH to 6000' and circulate biocide-treated water to clear tbg. |
| 13 | TOH and SB 4440' of tbg. LD remainder and stinger. |
| 14 | RUWL. PU 2 - 3-1/8" perf guns with 3 spf, 0.6" dia 120° phasing. Shoot 1' of squeeze holes at 4440' and 2' of holes at 4240'. RDWL. |
| 15 | PU CICR on 2 3/8" tbg. TIH and set CICR at 4270'. |
| 16 | RU Cementers. Establish circulation with biocide-treated water. Pump 5 bbl water w/ biocide, 20 bbl Sodium Metasilicate, and another 5 bbl spacer immediately preceding cement. |
| 17 | Pump Sussex Suicide: 140 sx class "G", w/0.25 pps Polyflake + 0.5% CFR-2 + 0.2% FMC + 0.5% LWA mixed at 15.8 ppg and 1.15 cuft/sk (161 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 200' in 10 1/2" hole with 20% excess plus 350' in 4 1/2" csg. Caliper log on file. |
| 18 | TOH to 3500'. Circulate water containing biocide to clear tubing. TOH standing back 990' of tbg. LD stinger. |

- 19 RUWL. PU 2 - 3-1/8" perf guns with 3 spf, 0.6" dia 120° phasing. Shoot 1' of squeeze holes at 1570' and 2' of holes at 960'. RDWL.
- 20 PU tension-set CICR on 2 3/8" tbg. TIH and set CICR at 990'.
- 21 RU cementers. Establish circulation with biocide-treated water. Pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
- 22 Pump Fox Hills Suicide: 360 sx (479 cuft.) Type III cement w/ 0.25 pps Polyflake, 0.3% CFR-2, 0.3% CFL-3 and 0.5% CaCl₂ mixed at 14.8 ppg and 1.33 cuft/sk. to place cement between perfs. Displace cement to CICR. Pull out of CICR and circulate at 960' to clear tbg and csg. Cement volume based on 580' in 4 1/2" csg, plus 610' in 10 1/2" open hole with 40% excess.
- 23 TOH and SB tbg. LD stinger.
- 24 RU WL. Cut casing at 380'. Circulate bottoms up and continue circulating to remove any gas from wellbore. RDMO WL.
- 25 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.
- 26 TOOH and LD 4 1/2" casing. Change pipe rams to 2 3/8".
- 27 TIH tbg open-ended to 990'
- 28 Establish circulation with biocide-treated water and get bottoms up to remove gas from annulus.
- 29 RU cementers. Pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer immediately preceding cement.
- 30 Pump balanced Stub Plug from 990'-100': 160 sx Type III w/ 0.25#/sk Polyflake + 0.5% CaCl₂ + 0.3% CFL-3 + 0.3% CFR-2 mixed at 14.8 ppg and 1.33 cf/sx (213 cuft of slurry). Cement volume based on 610' in 4 1/2" csg, 133' in 8 5/8" csg, and 147' in 10 1/2" OH + 40% excess.
- 31 TOH. WOC per cementing company recommendation. Tag cement. TOC should be at or above 133'. If not, consult Evans Engineering.
- 32 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.
- 33 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.
- 34 Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
- 35 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 36 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 37 Welder cut 8 5/8" and 4 1/2" casing minimum 5' below ground level.
- 38 Fill the casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 39 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 40 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 41 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 42 Back fill hole with fill. Clean location, level.
- 43 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.