

PLUG AND ABANDONMENT PROCEDURE

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STRONG P 21-2JI

- | 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 | Notify Naill flare crew to blow down Bradenhead when cotrollig well. |
| 3 | 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 9/21/2015 recorded Bradenhead pressure of 191 psi, blown down to 31 psi and no liquid was 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. |
| 4 | MIRU slickline services and VES. Pull bumper spring and tag bottom. Record tag depth and seating nipple depth. Run a gyro directional survey from 7460' to surface with 100' stations. RDMO slickline truck. Forward survey results to Sabrina Frantz in Evans Engineering. |
| 5 | Prepare location for base beam equipped rig. Install perimeter fence as needed. Arrange for 160 bbls of minimum 9.0 ppg mud to be delivered prior to setting the stub plug. |
| 6 | MIRU, kill well as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt. |
| 7 | TOOH and stand back 2 3/8" tbg: 240 jts total landed @ 7470'. |
| 8 | MIRU WL. RIH w/ gauge ring for 4 1/2" 11.6# csg to 7500'. RIH 4 1/2" CIBP and set at 7450' to abandon J sand perfs. Pressure test plug and csg to 1000 psi for 15 minutes. |
| 9 | RIH 2 3/8" tbg open-ended to CIBP @ 7450'. Hydro-test tbg to 3000 psi. |
| 10 | RU cementers and place a balanced plug above CIBP from 7450' to 6500' as follows: 55 sx "Thermal 35" + 0.5% CFR-2 + 0.25% FMC, mixed at 15.6 ppg and 1.51 cuft/sk. (83 cuft of slurry). |
| 11 | Pull and LD tbg to ~6000' and reverse circulate clean w/fresh water treated with biocide. |
| 12 | TOH and stand back 3930' of tbg. LD remainder. |
| 13 | RUWL. PU 2 - 3-1/8" perf guns with 3 spf, 0.6" dia 120° phasing. Shoot 1' of squeeze holes at 4620' and 2' of holes at 3900'. RDWL. |
| 14 | PU CICR on 2 3/8" tbg. RIH and set CICR at 3930'. |
| 15 | 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. |
| 16 | Pump Shannon/Sussex Suicide job: 280 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 (322 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 8 1/2" hole with 20% excess. Caliper log on file. |
| 17 | TOH 10 stands. Circulate water containing biocide to clear tubing. TOH standing back 1050' of tbg. LD stinger. |
| 18 | RU WL. Cut 4 1/2" casing at 950'. Circulate bottoms up and continue circulating to remove any gas from wellbore. RDMO WL. |

- 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. Install 2 3/8" pipe rams.
- 21 RIH with 2 3/8" tubing open-ended to 1050' (100' inside 4 1/2" stub).
- 22 RU cementers. Establish circulation with biocide-treated water and pump 10 bbl SAPP (Sodium Acid Pyrophosphate) followed by 20 bbl (min.) fresh water spacer.
- 23 Change well over to 9.0 ppg mud and circulate to remove gas from annulus. NOTE: Due to history of bradenhead pressure, it is very important to get all gas out of the hole prior to cementing.
- 24 Pump balanced Stub Plug from 1050'-239': 280 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 (372 cuft of slurry). Cement volume based on 100' in 4 1/2" csg, 200' in 8 5/8" csg, and 511' in 8 1/2 " OH + 40% excess.
- 25 TOOH. WOC per cementing company recommendation. Tag Cement. TOC should be at or above 339'. If not, consult Evans Engineering.
- 26 MIRU WL. RIH 8 5/8" CIBP to 80'. RDMO WL and WO rig.
- 27 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.
- 28 Supervisor submit paper copies of all invoices, logs, and reports to Evans Engineering Specialist.
- 29 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 30 Capping crew will set and secure night cap on 8 5/8" casing head, restrain the casing head, pressure test CIBP to 500 psi with hydrotest pump, then remove night cap and casing head restraints.
- 31 Excavate hole around surface casing enough to allow welder to cut 8 5/8" casing minimum 5' below ground level.
- 32 Welder cut 8 5/8" casing minimum 5' below ground level.
- 33 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 34 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 35 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 36 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 37 Back fill hole with fill. Clean location, level.
- 38 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.