

PLUG AND ABANDONMENT PROCEDURE

Engineer: Nicole Schaly
Cell: 419-908-8781

KERN L 4-12

| 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 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. RDMO slickline services. |
| 3 | Prepare location for base beam equipped rig. Install perimeter fence as needed. |
| 4 | Check and record Bradenhead pressure. If Bradenhead valve is not accessible, re-plumb so that valve is above GL. Last Form 17 (7/23/2014) recorded 61 psi that blew down to >1 psi after 30 minutes. |
| 5 | MIRU, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD. |
| 6 | Spot trailer with 7230' of 1.66" workstring. |
| 7 | TOOH and LD 1.90" production tubing (227 jts landed @ 7256'). |
| 8 | MIRU wireline. Run gyro survey from 100' above PBD (PBD ~7465') recorded in step 2 to surface with stops every 100'. Forward gyro survey data and invoices to Sabrina Frantz. |
| 9 | RIH gauge ring for 2 7/8" 6.5 #/ft casing to 7300'. POOH. Set CIBP at 7250' to abandon Codell perms (collars at 7214' and 7245'). RDMO WL. |
| 10 | Install 1.66" pipe rams in BOP. |
| 11 | PU 1.66" workstring and RIH to 7250'. Tag CIBP set at 7250'. Pumping water with biocide, pressure test the CIBP and production casing to 2500 psi for 15 minutes. If pressure test passes, proceed to next step; otherwise contact engineering for revised procedure steps to hydrotest 2 7/8" casing back in hole to spot stub plug prior to step 26. |
| 12 | RU Cementers. Pump Niobrara/Codell plug w/ 1.66" workstring: 15 sx (21 cuft) class "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/sx (650' inside 2 7/8" csg, no excess). The plug will cover 7250' - 6600'. RD cementers. |
| 13 | PUH to 6400' and circulate tubing clean to ensure no cement is left in the tubing. |
| 14 | TOOH 1.66" workstring, LD. |
| 15 | MIRU WL. Cut 2 7/8" casing at 5160'. RD WL. |
| 16 | Circulate with fresh water containing biocide to remove any gas. |
| 17 | Unland casing. NDTH, NDBOP. Install BOP on casing head with 2 7/8" pipe rams. Have choke or choke manifold on rig to be used if needed. |
| 18 | MIRU Cementers on the 2 7/8" casing. Pump 20 bbl sodium metasilicate and a 5 bbl water spacer. Pump Balanced Plug Across Casing Patch: 120 sx (138 cuft) Class "G" cement with 0.25 pps cello flake, 0.4% CD-32, 0.4% ASA-301 mixed at 15.8 ppg and 1.15 cuft/sx (200' in 11" OH from caliper with 20% excess). The plug will cover 5160' - 4960'. |
| 19 | PUH to 4700', circulate casing clean to remove any cement. |

- 20 WOC per cement company recommendation. Tag cement. Cement top needs to be above 5060'.
- 21 PUH to 4450', LD remainder.
- 22 MIRU Cementers. Pump 20 bbl sodium metasilicate and a 5 bbl water spacer.
- 23 Pump Sussex Balanced Plug: 250 sx (288 cuft) Class "G" cement with 0.25 pps cello flake, 0.4% CD-32, 0.4% ASA-301 mixed at 15.8 ppg and 1.15 cuft/sx (400' in 11.5" OH from caliper with 20% excess). The plug will cover 4450' - 4050'.
- 24 PUH to 3900', circulate casing clean to remove any cement.
- 25 WOC per cement company recommendation. Tag cement. Cement top needs to be above 4050'.
- 26 PUH to 1030', LD remainder.
- 27 MIRU Cementers. Pump 10 bbl (min) SAPP followed by a 20 bbl fresh water spacer. Pump Fox Hills Balanced Plug: 520 sx (692 cuft) Type III w/ cello flake and CaCl₂ as deemed necessary, mixed at 14.8 ppg and 1.33 cuft/sx (621' in 11.5" OH from caliper with 40% excess, 209' in 8 5/8" surface csg with no excess). The plug will cover 1030' - 200'. RD cementers.
- 28 Pull up to 100' and circulate tubing clean using fresh water treated with biocide. TOOH.
- 29 WOC per cement company recommendation. Tag cement. Cement top needs to be above 309'.
- 30 MIRU WL. RIH 8 5/8" CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. RDMO WL and WO rig.
- 31 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.
- 32 Supervisor submit paper copies of all invoices, logs, and reports to Joleen Kramer.
- 33 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 34 Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
- 35 Welder cut casing minimum 5' below ground level.
- 36 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 37 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 38 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 39 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 40 Back fill hole with fill. Clean location, level.
- 41 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.