

PLUG AND ABANDONMENT PROCEDURE

RADEMACHER 14-30 (HSR)

- | 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. RDMO slickline. |
| 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. |
| 5 | MIRU, kill as necessary using clean fresh water with biocide. ND WH. NU BOP. Unseat landing jt, LD. |
| 6 | TOOH and SB 2 1/16" production tubing (219 jts landed @ 7220'). |
| 7 | MIRU wireline. Run gyro survey from 100' above PBD (~7372') recorded in step 2 to surface with stops every 100'. Forward gyro survey data and invoices to Sabrina Frantz. |
| 8 | RIH gauge ring for 3 1/2" 7.7 #/ft casing to 7000'. POOH. |
| 9 | Set CIBP at 6980' to abandon Codell and Niobrara perms. RDMO WL. Pressure test to 1,000 psi. |
| 10 | RIH 2 1/16" tubing to 6980' while hydrotesting to 3000 psi. |
| 11 | RU Cementers. Pump Niobrara plug: 20 sx (28 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 (538' inside 3 1/2" csg, no excess). The plug will cover 6980' - 6442'. RD cementers. |
| 12 | PUH to 6200' and circulate tubing clean to ensure no cement is left in the tubing. |
| 13 | P & SB 4910' of 2 1/16" tubing, LD remainder. |
| 14 | RIH w/ 2 1/16" tubing to 4910'. |
| 15 | RU Cementers. Pump Sussex/Shannon balanced plug: 50 sx (58 cuft) class "G" w/ 0.4% CD-32, 0.4% ASA-301 mixed at 15.8 ppg and 1.15 cuft/sx (1120' inside 3 1/2" csg, no excess). The plug will cover 4910' - 3790'. RD cementers. |
| 16 | PUH to 3600' and circulate with water to ensure no cement is left in the tubing. |
| 17 | WOC per cement company recommendation, tag cement, cement top needs to be above 3790'. |
| 18 | P & SB 1030' of 2 1/16" tubing, LD remainder. |
| 19 | RU WL. Shoot off casing at or below 930'. RDMO WL. Circulate to remove any gas. |
| 20 | NDBOP, NDTH. Install BOP on casing head with 3 1/2" pipe rams. |
| 21 | POOH with 930' of 3 1/2" casing, LD. Install 2 1/16" pipe rams. |

- 22 RIH 100' past casing stub w/ 2 1/16" tubing to 1030'.
- 23 RU Cementers. Precede cement w/ 10 bbl SAPP and a 20 bbl fresh water spacer. Spot Fox Hills Stub plug: 200 sx (266 cuft) Type III w/cello flake and CaCl₂ as deemed necessary, mixed at 14.8 ppg and 1.33 cuft/sx (100' inside 3 1/2" casing stub with no excess, 301' covering 9.5" OH from caliper with 20% excess, and 209' inside 8 5/8" surface casing with no excess). The plug will cover 1030' - 520'. RD cementers.
- 24 PUH to 200' and circulate with water to ensure no cement is left in the tubing.
- 25 WOC per cement company recommendation, tag cement, cement top needs to be above 520'.
- 26 MIRU WL. RIH 8 5/8" CIBP to 80'. Set and pressure test to 1000 psi for 15 minutes. 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 Joleen Kramer.
- 29 Excavation crew to notify One Call to clear excavation area around wellhead and for flowlines.
- 30 Excavate hole around surface casing enough to allow welder to cut casing minimum 5' below ground level.
- 31 Welder cut casing minimum 5' below ground level.
- 32 Fill casing to surface using 4500 psi compressive strength cement, (NO gravel).
- 33 Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
- 34 Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
- 35 Properly abandon flowlines per Rule 1103. File electronic Form 42 once abandonment complete.
- 36 Back fill hole with fill. Clean location, level.
- 37 Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.

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